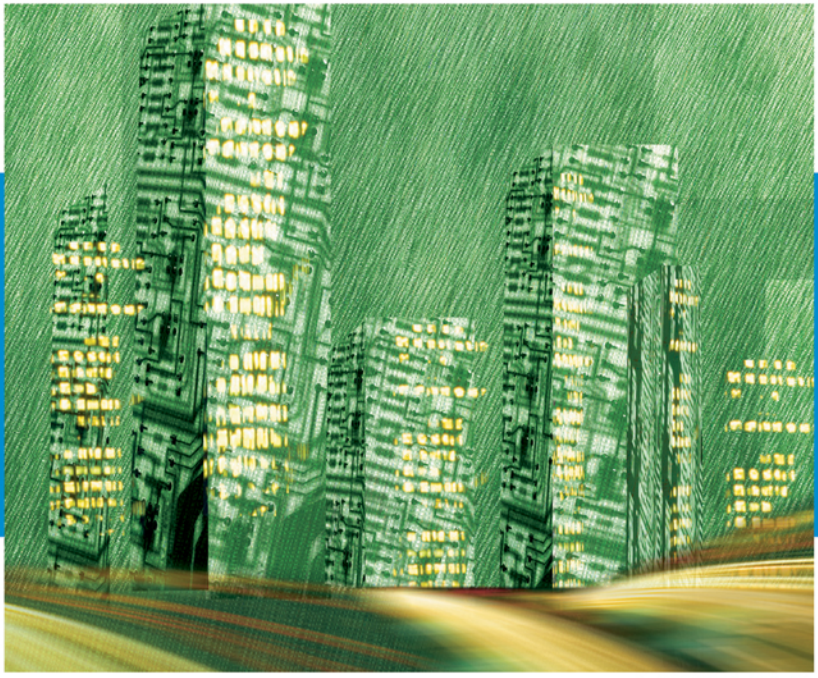
# ENCYCLOPEDIA OF
# DIGITAL GOVERNMENT



Ari-Veikko Anttiroiko
and Matti Mälkiä

VOLUME 3
I – Z

# Encyclopedia of Digital Government

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Volume I
A–D

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# Preface

The information technology revolution that has swept across the world has changed the way the governments work and interact with their stakeholders. This explains why digital government or electronic government (e-government) has become one of the most important topics in the public sector reform agenda. Such an e-transformation in government and public governance has its roots in the 1950s when some few professionals and academics started to speak about the computerization of public organizations. For several decades the discussion was meek, concerning mainly the use of computers in internal operations of public administrations, such as accounting and recordkeeping. Wider perspectives started to gain ground as late as 1980s in the wake of the introduction of personal computers and the merge of computers and telecommunications. Yet, the most fundamental recent turn in the information technology revolution was the Great Internet Explosion of 1993-1994 and the increased popularity of World Wide Web (WWW) in particular. Since then the transformative power of e-government has been generally recognized. *The Encyclopedia of Digital Government* discusses topics that are at the core of this ongoing transformation.

When Dr. Mehdi Khosrow-Pour of Idea Group Inc. in late 2003 invited us to edit a new encyclopedia on electronic government or digital government, we were eager to grab the opportunity. We had, together with our colleague Professor Reijo Savolainen, just edited a book titled *eTransformation in Governance: New Directions in Government and Politics* (IGP, 2004) and were keen to continue our ongoing intellectual journey towards the better understanding of e-transformation in government. With the continuously increasing interest in this topic all over the world, we felt that the time was ripe for such an endeavor. This is how the project got started.

Let us remind here that in spite of the slight differences in their connotations, we use the terms "digital government" and "electronic government" (e-government) synonymously. Our starting point has been to avoid one-dimensional or too narrow conceptions of digital government. This has allowed us to provide an open forum for academics and experts to present their views of digital government and related topics, which in turn has made it possible to create a collection of articles that reflects the richness of topics, concepts, approaches, and contexts in this new interdisciplinary research field.

Another reason for applying fairly broad conception of digital government was the paradigm shift in the political and administrative sciences themselves, sometimes expressed by the phrase "from government to governance." This refers to a general transition from hierarchical, command-and-control-oriented government toward citizen- and stakeholder-oriented, initiate-and-coordinate practices of public organizations. Such new orientations and practices have had their direct implications to digital government discourse. Thus, digital government is used here as a flexible umbrella concept that depicts the dynamic relationship between new trends in public governance and constant technological development.

The concept of digital government may be further divided into various subcategories, including such internally-oriented categories as e-administration, e-management, and e-organization and more externally-oriented areas such as e-service, e-governance, and e-democracy. It includes also more recent technology-driven conceptions, like u-government (ubiquitous government), m-government (mobile government), and g-government (GIS and GPS applications in government). E-government-related terminology is strongly interrelated, which has led to blurring of conceptual boundaries and caused occasional conceptual confusion. A good example is an occasional confusion between concepts of e-government and e-governance. In order to bring clarity to this field and to provide a coherent structure of the publication, we have paid special attention to the systemization of the conceptual field of digital government. The list of contents of this encyclopedia reflects this endeavor. It is our conceptual roadmap of the field in question and serves in placing articles in the most appropriate sections within a comprehensive structure. It goes without saying that many of the topics are closely interrelated, and similarly, many contributions fall into several categories. However, we believe that the structure we have used here— as seen in Contents by Section and Category—serves this publication well enough and possibly also contributes to a better understanding of the conceptual field of and discourses on digital government.

This encyclopedia is divided into 12 sections and over 50 categories. Key topics include: The concept of digital government; e-transformation in government and public governance; e-government policy and regulation; international e-government; state and local e-government; public e-management; IT management and planning in public organizations; e-administration; office systems; work processes; e-human resource management; knowledge and information management; e-government project management; e-commerce in government; evaluation of e-government; electronic service delivery; management of e-services; access solutions; user interfaces; various types of e-services (e-health, e-social welfare, e-school and e-learning, e-law, etc.); e-citizenship; public e-governance; e-democracy; e-participation; e-politics; e-rulemaking; e-voting; technological solutions in digital government; and social issues and dilemmas of digital government (e.g., digital divide, e-inclusion, e-development, access to information, digital rights management, privacy, cyber warfare and terrorism, and ethics of digital government). This is not an exhaustive list, but serves our purposes well enough. Having digital government in focus, generic aspects of information and communication technologies were given a minor role, not least because there are a range of encyclopedias and handbooks available on this topic, such as *Encyclopedia of Information Science and Technology, Vol. I-V* (Idea Group Reference, 2005), edited by Mehdi Khosrow-Pour.

To ensure that this publication provides the best possible coverage and in-depth knowledge of digital government, we invited experts, practitioners, and scholars from all over the world to contribute to the encyclopedia. They represent various academic disciplines (e.g., information science, computer science, management science, administrative science, political science, sociology, economics, communications studies, and business studies), national and regional cultures, and scholarly and practical traditions and approaches. Of hundreds of proposals some 250 articles, written by more than 400 authors, were finally accepted to be published in the encyclopedia. The quality control followed conventional academic review procedure, in which each submission was forwarded to two to four reviewers on a double-blind, peer review basis. Most of the authors of this encyclopedia as well as most of the members of our International Advisory Board contributed to the review process. In addition, more than 100 external reviewers were involved.

All entries are written by knowledgeable, distinguished scholars from many prominent universities, research institutions and expert organizations around the world. What we particularly strived for was a wide geographical coverage of the global scientific and practitioner community involved in the project. We did this to show what are both the development phases and the current understandings of digital government in different parts of the world. This has made it possible to paint an authentic picture of the cultural differences in understanding and approaching digital government and in dealing with the current and emerging context-specific issues of digital government. This also widens the topics discussed in the Encyclopedia, thus making the Encyclopedia a useful publication that will appeal to a wide international readership. What our editorial policy implies is that the final selection of articles reflects not only the most up-to-date academic and practical knowledge in the field, but also the ways in which the various topics are currently discussed and understood around the world.

The *Encyclopedia of Digital Government* is presently the most comprehensive academic publication available in the field of digital government. With more than 500 people involved, the encyclopedia project has been, if not the biggest, at least one of the biggest international collaborative projects ever in the field of digital government.

The *Encyclopedia of Digital Government* offers a broad picture of the issues, concepts, trends, and technologies of digital government. The challenges and future prospects faced by governments at different institutional levels and in different parts of the world are also described in many articles. With some 250 articles, this three-volume set provides a broad basis for understanding the challenges and issues faced by public organizations as they strive for more efficient, responsive and transparent government through the use of emerging technologies. In all, we believe that the *Encyclopedia of Digital Government* contributes to a better understanding of theory and practice of the e-transformation in government and public governance. It is our hope that this publication and its vast amount of information will assist academics, students, experts, developers, managers, decision-makers, and civic actors all over the world in enhancing their understanding of digital government and even in making the world better place for us all.

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*February, 2006*

# Acknowledgments

The *Encyclopedia of Digital Government* is a result of a close collaboration of the publisher, editors, authors, and reviewers. It goes without saying that we are grateful to all the people who have been involved in making this publication a success.

First of all, we want to thank all of the authors for the time and effort they have devoted to this project and for their insights and excellent contributions to this encyclopedia. It has been a true pleasure to work with colleagues and experts from different parts of the world, representing various disciplinary fields and scholarly and practical traditions. We also want to express our special appreciation for the authors who wrote several articles and served the project also as reviewers. You have done a huge work. Thank you all!

Another group that needs to be mentioned here is our International Advisory Board. Its members include Professor Kim Viborg Andersen, Copenhagen Business School, Denmark; Professor Antonio Alabau, Polytechnic University of Valencia, Spain; Professor Ted Becker, Auburn University, Alabama, USA; Professor Subhash Bhatnagar, Indian Institute of Management, Ahmedabad, India; Dr. Lyn Carson, The University of Sydney, Australia; Professor Roger Caves, San Diego State University, USA; Professor Yu-Che Chen, Iowa State University, USA; Professor Stephen Coleman, Oxford Internet Institute, Oxford University, UK; Professor Matthias Finger, EPFL, Lausanne, Switzerland; Professor Patricia Fletcher, University of Maryland, Baltimore County, USA; Professor Shunichi Furukawa, University of Tsukuba, Tsukuba, Japan; Dr. Thomas F. Gordon, Fraunhofer FOKUS, Germany; Professor Åke Grönlund, Örebro University, Örebro, Sweden; Professor Nicos Komninos, Aristotle University, Thessaloniki, Greece; Professor Kenneth Kraemer, University of California, Irvine, USA; Professor Jae-Kyu Lee, KAIST, Seoul, South Korea; Professor Ann Macintosh, Napier University, Edinburgh, UK; Professor Toshio Obi, Waseda University, Tokyo, Japan; and Professor John Taylor, Glasgow Caledonian University, Glasgow, UK. Special thanks to all the members of the Board for their support to the encyclopedia project. We are also happy that so many of them contributed to the publication by submitting their own authoritative articles.

Most of the authors of articles included in this encyclopedia as well as the members of the International Advisory Board served as referees for submissions. Thanks go to all those who provided their constructive and comprehensive reviews, thus contributing to the quality control of this publication project. In addition to this, we used a number of external reviewers. They include: Mr. Hany Abdelghaffar, Professor Jennifer A. Amyx, Dr. Giovanna Anselmi, Mr. Muhammad Hasmi Abu Hassan Asaari, Dr. Parthasarathi Banerjee, Mr. Luiz Carlos Begosso, Dr. Emilia Bellucci, Dr. Paul Beynon-Davies, Mr. Bin He, Dr. Frank Bongers, Mr. Jean-Claude Burgelman, Professor Alain Busson, Mr. David F. Carr, Mr. James George Chacko, Mr. Chinnapaka Chitharanjandas, Mr. Michel Chevallier, Mr. Kin Cheong Chu, Dr. Ramón Compañó, Ms. Maura Conway, Mr. Anthony M. Cresswell, Dr. Barbara Crump, Dr. János Czeglédi, Professor Elisabeth Davenport, Dr. Reggie Davidrajuh, Mr. Fanuel Dewever, Professor Horatiu Dragomirescu, Mr. Andre Durand, Dr. Edgar Einemann, Ms. Dawn L. Ellis, Dr. N. Ben Fairweather, Ms. Lorraine Fiander, Mr. Gunar Fiedler, Dr. Florin-Gheorghe Filip, Ms. Agata Filipowska, Professor James Foreman-Peck, Professor Mário Marques Freire, Professor Simon French, Professor Péter Futó, Professor François-Pierre Gingras, Dr. Narasimhaiah Gorla, Ms. Vanessa Gray, Professor Margaret Grieco, Professor Rüdiger Grimm, Dr. Wlodzimierz Gromski, Mr. Luis Borges Gouveia, Professor Raymond A. Hackney, Dr. Jo Hadley, Professor David Hakken, Professor Arto Haveri, Dr. Kevin Kai-Wing Ho, Dr. Lynley Hocking, Professor Sid L. Huff, Mr. Pekka Huovinen, Professor Yeoul Hwangbo, Professor "John" J. H. Im, Professor Takao Ito, Ms. Birgit Jæger, Professor Pertti Järvinen, Dr. Siegfried Kaiser, Ms. Noorliza Karia, Professor Ilari Karppi, Professor Erkki Karvonen, Professor Pekka Kettunen, Mr. Tony Kieran, Professor Ikuo Kitagaki, Ms. Bernadett Köteles, Professor Hiroko Kudo, Professor Jukka Kultalahti, Professor Fernando José Barbin Laurindo, Professor Rob Law, Professor Dalgon Lee, Mr. Gyorgy Lengyel, Dr. Kar Wing Li, Mr. Eric T.K. Lim, Mr. Tiehan Lu, Dr. Paul Lucardie, Professor C. M. Magagula, Mr. Josef Makolm, Mr. Marco De Marco, Professor Alfonso Mateos Caballero, Dr. James E. McMillan, Dr.

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In a publication project like this the publisher deserves a special mention. We want to thank the publishing team at Idea Group Inc., whose contributions throughout the whole process from inception of the initial idea to final publication have been invaluable. It has always been a pleasure to work with Senior Technology Editor Dr. Mehdi Khosrow-Pour as well as with Managing Director Jan Travers and Associate Marketing Manager Dorsey Howard. During the last two years we have worked closely with three amazing women, Sara Reed, Renée Davies and Michelle Potter, whose professional help made this publication possible. Such great support from the IGI editorial team makes them no less than a group of co-editors of the encyclopedia. Without them, this publication would not have been possible.

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*February 2006*

# About the Editors

Mr. **Ari-Veikko Anttiroiko** is an adjunct professor in the Department of Regional Studies, University of Tampere, Finland. He holds a PhD (Administrative Sciences) and MPhil (Philosophy) degrees, both from the University of Tampere. He has also received a Licentiate degree in social sciences from the University of Jyväskylä. Anttiroiko has conducted and directed several research projects, including The Future of Electronic Services in Local Government and the Local Governance in the Information Society financed by the Academy of Finland. He has worked as an expert in many e-government-related projects and organizations, such as the Regional Information Society Initiative (RISI), the European Regional Information Society Association (ERISA), the UK-Nordic Initiative on ICTs, and the DemocrIT of Örebro University. He has collaborated with local government and e-government experts all over the world and has conducted expert work in different countries, recently in a capacity building project (CABLE) in Namibia, in the Expert Advisory Group of UNDP Democratic Governance Practice Network, and in the Executive Master in e-Governance coordinated by EPFL, Switzerland. His academic contributions include in a nutshell some 27 monographs and 40 articles and numerous conference/seminar papers. He is a co-editor of *eTransformation in Governance: New Directions in Government and Politics* (IGP, 2004) and *e-City—Analysing Efforts to Generate Local Dynamism in the City of Tampere* (Tampere University Press, 2005) and the editor of the *Special Issue of IJTM on Global Competition of High-Tech Centres* (IJTM, Vol. 28, Nos. 3/4/5/6, 2004). He has memberships in several scientific organizations and editorial boards, including membership in the Program Committee of IRMA (since 2003) and in the editorial board of *Electronic Government—An International Journal*.

Mr. **Matti Mälkiä**, M. Soc. Sc., is a senior lecturer (Administrative Science and Leadership) at The Police College of Finland, situated in Espoo, Finland. He has worked there since 1999, and is responsible for strategic management and leadership education and training for senior police officers. Before moving to the College he has worked about 12 years at the University of Tampere, Department of Administrative Science, in different research and teaching positions. Mälkiä has about 100 publications, including 10 monographs, 4 edited books and about 35 research articles. Most of these have been published in Finnish language, covering various aspect and themes of public administration, public organizations and public management. During 1993-1998 Mälkiä served first as a co-chair and then as a chair for International Social Science Council, Committee on Conceptual and Terminological Analysis (ISSC/COCTA)—an international and interdisciplinary research program focusing on conceptual and terminological analysis and social science communication. Mälkiä has organized several national and international scholarly conferences, including CIPA'99 —Citizens and Public Administration in the Information Age: Constructing Citizen-Oriented Society for the Future (August 1999) and he is a co-editor of the book *eTransformation in Governance: New Directions in Government and Politics* (IGP 2004). Mälkiä is currently concentrating his research on police administration and police management, including application of ICTs in this field.

# Access to and Use of Publicly Available Information

A

**Philip Leith**
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## INTRODUCTION

Public information presumes that the information is somehow public and, presumably, that this can be utilized by members of the public. Unfortunately, things are more complex than this simple definition suggests, and we therefore need to look at various issues relating to public information which limit access and usage, for example, the nature of privacy, sharing information within government, court records, ownership of public information, and freedom of information. The exemplars dealt with later in the article will demonstrate the legal constraints upon the usage of public information in a digital environment and help raise awareness of such limitations.

Public information cannot be formally defined (as a list of items, say) except to indicate it is that information which has historically been available to the public in print form and/or through some generally open process. No formal definition is possible because this depends to a very large extent upon cultural differences. For example, tax returns are viewed as private documents in the United Kingdom open only to the tax authorities (unless otherwise authorized, e.g., in criminal proceedings) whereas in Sweden they can be accessed by any member of the public. Furthermore, the source of public information may also vary: what information is produced by a public authority in one country may not be so carried out in another.

The legal constraints upon access and use of public information include the following:

- Privacy/confidentiality of public data
- Sharing and processing of public data collected for divergent purposes
- Freedom of information rights to public data
- Copyright and database rights in public data

Access to public information may be enabled through a formal public register, through statutory mechanism, or other less formal means. Note that being accessible does not necessarily mean that users are free to use this information in any way they wish: copyright licenses in particular are not always passed along with access rights, so that the public may inspect a document but may not use it in other ways (such as republishing). Reasons for this are obvious: the collection of data by government can be expensive and there can be opposition to subsidising commercial activity from the public purse. In the United States, federal materials are explicitly excluded from copyright protection, but this is rarely the case in Europe (see www.hmso.gov.uk for the UK situation).

Another example is that it is possible in most countries to attend local criminal courts or peruse local newspapers and draw up a database of prosecutions in the local area. The database could include information on drunk drivers, sexual offenders, and burglars, and it would be possible to include a wide variety of information—all of it, clearly, of a public nature. Indeed, such activities have been common for many years where credit agencies have collected information from courts on debtors and made this available on a commercial basis. But there are questions: Is all court-based information public? What limitations might be found in some countries and not in others to the dissemination of this information? See Elkin-Koren and Weinstock Netanel (2002) for the general tendency toward commodification of information and Pattenden (2003) for professional confidentiality where it impinges upon public service.

On a more mundane level, judgments from most European courts are copyright of the relevant government or agency. In the United Kingdom, differing again, there is some dispute over whether the judge or Court Service owns the judgment, and frequently the only text version of a judgment is copyright of the privately employed court stenographer.

Thus the publicly available information which is being discussed here is that which emanates from a public authority and can be accessed by members of the public, but will usually have some constraint and limitation on how it can be reused by the public. We are interested in outlining these constraints.

## BACKGROUND

Much of what has driven recent legislation concerning publicly available information has been fear of the differ-

ences between print access and digital access—particularly that of ease of access and length of period of access. Even in 1972, the Younger *Report on Privacy* (1972) noted that there was concern discovered in their research over the usage of computers for the collection of data when there were 4,800 computers "in use or on order." The situation has become much worse—to the privacy advocate—since the inception of the Internet and a freefall in the price of storage. Access to information is global and with the rise of systems such as Google's caching mechanism and the *waybackmachine* (www.waybackmachine.org). Once information has been put onto a Web server, it can be difficult to remove it from public view.

In the case of *Lindqvist*, we can see the legal system is having difficulties in treating these new developments as a natural growth from print technologies. Mrs. Lindqvist set up a parish Web site for her church which noted that a member of the local community had hurt his foot. She was prosecuted by the Swedish Data Inspection Board for failure to register her processing of personal data and for revealing sensitive personal data about the owner of the hurt foot. She was also prosecuted for transferring this to third countries by making it available on the Internet. The case was referred to the European Court of Justice (ECJ) for clarification on various matters relating to data protection. The court found that

*The act of referring, on an internet page, to various persons and identifying them by name or by other means, for instance by giving their telephone number or information regarding their working conditions and hobbies, constitutes the processing of personal data.... Reference to the fact that an individual has injured her foot and is on half-time on medical grounds constitutes personal data concerning health. ...* (Case C-101/01, Judgment November 6, 2003)

However, it did not find that Web publishing was transferring this information to third countries. This decision shows the ECJ's perspective on two fronts. First, it shows that it holds that medical information on the individual should usually be protected from data processing unless permission exists; and second, that it sees a distinction between whether Mrs. Lindqvist had produced her local gossip in print or in digital form. This latter point is important: we can expect less and less material to appear in print rather than digital format, so a practical pressure is being applied by data protection law to change the nature of communication within local communities, as well as within the national or international sphere.

It is in this quirky context that European access to digital public information must be viewed.

## THE PUBLIC/PRIVATE DIVIDE IN A DIGITAL ENVIRONMENT

There is much information that is publicly available but that can potentially be problematic in a number of ways when we move into a digital environment. It is clear that this public information access can sometimes be viewed as undesirable: the information is certainly public, but when it is print based it can be difficult to access and—except to the industrious researcher—tends to be hidden from public view. In particular, this is information that relates to a particular individual—say his or her criminal record, ownership of property, grants received from government, his or her tax return, and so forth. In a digital e-government environment the public nature tends to become magnified simply by the ease of storage, processing, and access.

A second kind of public information is that which the public may have a right to know and access in order to ensure that a public authority is carrying out its tasks properly and effectively. Such information is subject to freedom of information legislation (see Birkinshaw, 2005) in many countries. Much of this pubic information necessarily touches upon private information—letters/e-mails from citizens to public authorities, data collected as part of everyday government tasks, commercially sensitive information. Where should the line be drawn between what is public and what is private?

At the heart of the question of what is public and what is private is the philosophical debate over the nature of government, the role of the citizen in government, and the role of government in overseeing proper standards of the citizen's behaviour. Classical theories are well known in the literature and certainly have had effect upon the development of legislation. However, such abstract theories are difficult to put into practice and the legal texts have most usually lacked clarity for obvious reasons. For example, *The European Convention on Human Rights* gives weight to private life in Article 8 (1):

*Everyone has the right to respect for his private and family life, his home and his correspondence.*

But immediately constrains that right in Article 8 (2):

*There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.*

For example, the debate over abortion rights has shown the depth of disagreement which is possible with each side drawing comfort from each of the clauses. The problems that we look at below are some examples of this kind of debate over the citizen/state role, and the rhetoric that one finds surrounding these debates are clearly related to these differing philosophical assumptions.

Note that these legal conventions are formally applicable to governments (indeed, they arose from the after effects of the Nazi era) and their relationship to the individual citizen. However, the courts have developed a jurisprudence which has effectively allowed the citizen to use these public laws against other citizens and/or commercial concerns. This is technically known as horizontal effect. For example, in *Von Hannover v Germany* [2004] ECHR 294, Princess Caroline of Monaco succeeded in arguing that the press was enabled to invade her privacy due to the German government not having effective privacy laws in place. The ECHR ruled:

*in the Court's opinion the criteria established by the domestic courts were not sufficient to ensure the effective protection of the applicant's private life and she should, in the circumstances of the case, have had a "legitimate expectation" of protection of her private life.... Having regard to all the foregoing factors, and despite the margin of appreciation afforded to the State in this area, the Court considers that the German courts did not strike a fair balance between the competing interests.* (Paras 78/79)

Given this ruling, it is not simply the German government that has to consider whether its legislation allows an appropriate balance between the press and individual, but all governments who are constrained by the European Convention of Human Rights.

## SHARING INTERNAL E-GOVERNMENT INFORMATION

One form of information is what is processed within a specific government department or departments or agencies: that is, the last in the list of legal problems relating to data sharing. Data sharing simply means that one arm of government is enabled to access information collected by another arm. The reasons for this sharing may be related to efficient processing, fraud prevention, or a number of other reasons. This is the more traditional form of data processing and is generally covered by the European Union (EU) Data Protection Directive (Directive 95/46/EC and the relevant national implementation). This information is much more akin to the internal processing found in business and commerce, and data protection law requires that the government department gives the data subject similar protections to those given in commercial processing of data. Thus, for example, when data are collected from a member of the public for usage by a public authority, they should be used for only the specified purpose:

*Personal data shall be obtained only for one or more specified and lawful purposes and shall not be further processed in any manner incompatible with that purpose or those purposes.* (Third Data Protection Principle, UK Data Protection Act 1998)

This is not to say that internal government usage of information is nonproblematic. Indeed, e-government is about efficiency and effectiveness and the most efficient way of processing information is by sharing data within government, frequently for purposes that differ from those where the data were gathered:

*4.02 Better data use can streamline a citizen's dealings with public services, by enabling a single point of contact to deal with all but the most complicated queries—a similar process already happens in banking, insurance and other telephone call centers. By enabling the service provider to access a range of relevant information, enquiries can be responded to more quickly and efficiently, and services can be tailored to meet the needs of the individual client. Better use of information held in the public sector can therefore deliver a range of personal benefits, such as accessibility, responsiveness, and speed and accuracy of service.* (Cabinet Office, 2002)

Unfortunately, the historical structure and also currently changing structure of government do not easily allow commercial techniques to be transferred over: for example, government is fragmented into central and local authorities; and the new public governance involves private partners carrying out what were originally government tasks. To streamline communications between the diverse parts of the new governance systems involves a consideration of how privacy and data protection law can be complied with as well as discussion of how public/administrative law is changed by such streamlining.

Further, where private partners are involved, there can be significant value in the commercial confidentiality of that relationship between private partner and government (not least against those who may wish to bid for business in the future). The new open governance which freedom of information (FoI) law is developing conflicts with commercial confidentiality and we see a growing

interest in using FoI to access this information, despite (in the United Kingdom at least, and also in the European Commission) there being a commercial defense to providing information. It is also likely that companies will become hesitant about providing information (data sharing) to public authorities which could become the subject of FoI requests by the public: most FoI requests in the United States are by companies wishing to discover information concerning other companies and the latter's relationship to government.

The United Kingdom has been the European leader of this new mode of governance, but we should expect that it will become more dominant across Europe in the future, and these problems of data sharing and FoI access will become more prominent legal aspects of e-government information handling.

## ACCESS TO INFORMATION: COURT RECORDS AND OPEN JUSTICE

The court systems in Europe have traditionally been underfunded and computer provision has been poor. E-government has offered a means to improve the effectiveness of court systems in Europe and also cut costs. The Council of Europe has recognised this and produced two recommendations (Council of Europe, 2001). For most e-government information processing, there are relatively few problems: courts receive and send monetary sums, reports, produce judgments, and so forth, in a manner much like a power company's billing office. However, these new technologies also have the ability to radically change the nature of the relationship between the citizen and the court: rather than being a distant notion where reports on criminal activities are mediated by the press, it is possible now to set up systems whereby the public can gain direct access to criminal records. This is because, as mentioned above, there is a general right to open justice in European countries to attend court and to collect information and publish details on the case. Some countries have routine restrictions on reporting certain courts (e.g., family courts or those dealing with child offences).

In 1965 President Lyndon B. Johnson set up a Commission on Law Enforcement and the Administration of Justice to investigate causes of crime and prevention which looked to computerization of the courts (see Marchand, 1980). This was one of the first instances where privacy was raised as a potential issue—the commission observed that the inefficiency of manual files provided a built-in protection of privacy which would no longer be available with computerization. The systems that were developed in the United States (e.g., the National Crime Information Center) were not, of course, public access systems, but there were accusations that they almost became so. Marchand states:

*Not only did NCIC permit access to the information by federally insured banks and private employers with state contracts but it also permitted a variety of secondary access. Data could be made available to credit agencies and private employers through a "friendly cop." In addition, much of the information supplied to such private individuals or agencies could be wrong or outdated.* (p. 147)

The information on these systems related as much to pre-court (or simply police files with no intention to prosecute). Courts will also have similar kinds of information (defendants who have been found not guilty or where charges were dropped as the case neared) as well as the more formal and public information about successful prosecutions. It is not difficult to imagine that with such latter information in digital format available via the Internet (and available to the public) a few seconds would be sufficient to download the criminal history of an entire town.

Criminal records are thus a good example of one problem of publicly available information—the limits to rights to information. Allowing access is in line with Article 10 of the European Convention on Human Rights and also with notions of open justice, and denying access is perhaps in line with Article 6 (right to a fair trial), but more usually on principles relating to the rehabilitation of the offender. As examples we can cite the freely available information from the Minnesota Department of Corrections (http://www.doc.state.mn.us/). Users of this state Web site can locate offenders (and view images of them) by name and access information on their crime, date of expected release, and so forth. Other U.S. states also have information of this kind available, for example, Illinois (http://www.idoc.state.il.us/), Ohio (http://www.drc.state.oh.us/), and North Carolina (http://www.doc.state.nc.us/).

There are no similar sites in Europe (where there appears to be more sensitivity to the prisoner's plight), but it is perfectly possible that a growing public demand for such information will lead to it being available in future—for example, there remains a desire amongst many in Britain to have access to child abuse registers. For example, the campaign by one UK newspaper to have an equivalent to the Megan's Law of the United States (http://www.forsarah.com/html/mainpage.html). This campaign turned slightly ugly when the newspaper published addresses and details of sex offenders which resulted in vigilante action on the individuals. Of course, in discussion of these kinds of topics, we have to remember there is a class element—sex offenders are usually rehoused,

not in middle-class suburbs, but in lower-class estates. The Sexual Offences Act 2003 details access to the register. See Torremans (2004) for an overview of human rights law versus freedom of expression and copyright.

Furthermore, a UK government report noted:

*About 60 percent of enforcement in the county courts is ineffective because the claimant cannot find the necessary information about the debtor to enable him to take the right method of enforcement, or even to send the bailiffs to the right address. The current enforcement system in the civil courts is reliant on information being supplied by the creditor, and then on the compliance of debtors to provide accurate or truthful information.* (Cabinet Office, 2002, p. 16)

An e-government system implementation that wished to improve effectiveness would surely have to allow public access to this kind of information when it was held by another arm of government.

With the use of technology in prisons to organize prison life and in courts to better administer court processing, it is clear that the digitized information on various elements of criminal and civil records is available. The automatic presentation of such information to the public via a Web site would be trivial—and the site could be designed to remove information as required by rehabilitation legislation (in the United Kingdom this is the Rehabilitation of Offenders Act 1974).

There are clear freedom of expression arguments for making this kind of information public. Article 10 of the ECHR which provides the legal context in Europe deals with access to information (to receive and impart information):

*1 Everyone has the right to freedom of expression. This right shall include freedom to hold opinions and to receive and impart information and ideas without interference by public authority and regardless of frontiers. This article shall not prevent States from requiring the licensing of broadcasting, television or cinema enterprises.*

But Article 10(2) places limits on that freedom:

*2 The exercise of these freedoms, since it carries with it duties and responsibilities, may be subject to such formalities, conditions, restrictions or penalties as are prescribed by law and are necessary in a democratic society, in the interests of national security, territorial integrity or public safety, for the prevention of disorder or crime, for the protection of health or morals, for the protection of the reputation or rights of others, for preventing the disclosure of information received in confidence, or for maintaining the authority and impartiality of the judiciary.*

Why would one want this information? Neighbors of criminals, battered ex-wives, and victims would certainly be interested. There may just be a desire to know, which unpleasant as it may be to some, is not in itself a criminal or morally repugnant activity. We see that information such as outlined previously is available in the United States where freedom of expression (based on the First Amendment to the Constitution) is given priority in many legal arguments. It is perfectly conceivable that such an attitude may develop at some point within European jurisprudence. See Toulson and Phipps (2004) for an opposing discussion of confidentiality.

The development of systems such as are available in Minnesota has raised interest in these issues in the United States. The Minnesota Supreme Court, for example, has published a report on access to court records (Minnesota Supreme Court, 2004). Whilst seeing potential problems in bulk data provision, the report clearly highlights why access to court records is of value to many:

*Perhaps the least discussed, although most widely shared, benefit resulting from accessible judicial records is the use of those records as part of the critical infrastructure of our information economy. Reliable, accessible public records are the very foundation of consumer credit, consumer mobility, and a wide range of consumer benefits that we all enjoy. There is extensive economic research from the Federal Reserve Board and others that demonstrates the economic and personal value of accessible public records, but it does not require an economist to see that lenders, employers, and other service providers are far more likely to do business with someone, and to do so at lower cost, if they can rapidly and confidently access information about that individual.* (p. 76)

Other states, too, have carried out substantial investigation of these issues (e.g., New York State at http://www.courtaccess.org) as has the National Center for State Courts (http://www.ncsconline.org/).

Opposition to opening easy access is not usually made on privacy grounds. Rather, the argument is that for integration into the community—for criminal records in particular—of the criminal:

*A key element of sentencing is the rehabilitation of offenders to reduce re-offending and contribute to safer communities. Employment is an important aspect of resettlement—it can halve the risk of re-offending—yet a criminal record can be a real barrier. Effective*

*arrangements must be in place to ensure that, where it is safe to do so, individuals can put their past behind them.* (United Kingdom Home Office Web Site, 2005)

Open justice also has several possible limitations allowed by Article 6 of the European Convention on Human Rights:

*Judgement shall be pronounced publicly by the press and public may be excluded from all or part of the trial in the interest of morals, public order or national security in a democratic society, where the interests of juveniles or the protection of the private life of the parties so require, or the extent strictly necessary in the opinion of the court in special circumstances where publicity would prejudice the interests of justice.*

The United Kingdom, as mentioned above, has banned public access to family court hearings (R.39 Civil Procedure Rules). There has been significant unease recently due to single issue organizations who argue that this hides biased decisions (usually against fathers) from the public. For example, one litigant Pelling ([2005] EWHC 414 (Admin)) unsuccessfully attempted to have the ECHR rule that public access was necessary for the interests of justice (*B. and P. v. The United Kingdom* [Applications nos. 36337/97 and 35974/97] April 24, 2001). One celebrated instance of the unease was caused by Professor Roy Meadows, "discoverer" of the Munchausen syndrome by proxy, who was struck off by the General Medical Council for his behaviour as an expert in child abuse cases. One newspaper suggested:

*The problem with child protection cases, especially those involving expert witnesses, is that unless and until they result in a criminal trial, they take place in secret behind closed doors. The media has no access and there is therefore minimal opportunity for transparency or scrutiny. If one wants to prevent further miscarriages of justice taking place and for a system that often relies on expert witnesses to sustain, then the answer is to open up that system to scrutiny and let the open justice principle break its way into family courts.* (The Guardian, July 19, 2005)

## COPYRIGHT AND DATABASE RIGHTS: WHO OWNS PUBLIC SECTOR INFORMATION?

There is a second kind of information that is publicly available and at which the European Commission has recently been looking: that of information produced by public authorities where the public authority owns the copyright or the database rights. Such information can be economically valuable and long lasting: for example, UK crown copyright protection is 50 years from publication and databases (Directive 96/9/EC on the legal protection of databases) are protected from extraction for 15 years on a rolling basis.

Who should have access/use/reutilization rights to this information? From one perspective, it is "public" having been produced through the public purse, and from another, it is an asset of the public authority. In a framework where such information has value, should public authorities be able to control its usage? And what, if licenses are to be given, of issues of costing usage/access of such materials? (See Love, 1995 for an overview.)

Governments generate large amounts of information which in Europe is copyrighted and therefore can potentially be difficult for commercial providers to access. Commercial access to bulk data would be very attractive, and indeed has been attractive in the past where voter registration information has been collected and supplied. In the United States, such federal information is specifically excluded from copyright protection and commercial firms can utilize these data without the constraints of copyright law. The Information Society programme of the EU (http://europa.eu.int/information_society) is concerned with building a vibrant information marketplace and—seemingly encouraged by the U.S. model—has attempted to harmonize European access to this governmental information known as Public Sector Information (PSI) so that information products can be built which are cross-border and European in every way. A proposed directive was produced which would have introduced the concept of "a generally accessible document":

*generally accessible document" means any document to which a right of access is granted under the rules established in the Member State for access to documents as well as any document used by public sector bodies as an input for information products or services which they commercialise.* (Art 2(4) Com(2002) 207)

The notion behind the proposed directive was that even if a government department produced a commercial version of documents it held, others would be enabled to use these as the basis of products or services:

*The sheer size of the economic value of public sector information in the European Union shows the potential of this area: the value has recently been estimated at around 68 Billion (Euros). This is comparable to the size of industries such as legal services and printing. A better use of the economic potential of public sector information will lead to increased activity and job-creation in the*

*digital content industries. Many of these jobs will be created in SMEs [small and medium-sized enterprises].* (Pira, 2000, p. 6)

Given that the documents might include geographic data and related information which could be linked together, the commercial opportunities for information providers were substantial (and some research projects in this area have been supported by the Commission under the e-content programme—see http://www.cordis.lu/econtent/home.html). In the event, the concept of generally accessible document was removed from the eventually agreed directive and governments were enabled to control more closely their commercial exploitation.

Why is this important? Because it is clearly the start of a European debate over the ownership and use of public information which can only grow as the importance of the information economy grows. There is no reason why the state should have any more right to these data than the citizen (including the citizen who wishes to undertake commercial activities) excepting that financial pressures are being brought to bare upon government agencies to self-fund themselves. Moreover, the changing relationship in the new government models means that independent agencies are now undertaking tasks that were previously carried out by the state. Who is to own, manipulate, and commercialize this kind of information? Is it the state, the commercial partner of the state, or will that information become a commodity upon which all can base added-value services and products?

## COMMERCIAL CONFIDENCE AND FOI

The new governmentality model is based on the partnership between government as director and agency as task manager. The agency may be a regulator, a semiautonomous government spin-off, or it may be a fully commercial partner. The relationship between these agencies and governments are clearly problematic when it comes to access to information—what may be viewed as of public interest can quickly become private interest: as a private interest the owner can protect this through trade secret law and law of confidentiality generally. Since confidentiality relies upon keeping the reason why something is confidential itself, it is a very powerful tool indeed. The standard UK work on confidence remains (Gurry, 1984).

There has been much debate in the United Kingdom over the value of public finance initiatives (PFI) and public-private partnerships (PPP) which have been the Labour government's preferred tool to invest in the public sector. The basic idea has been that in the past, these large spending contracts (schools, hospitals, etc.) were high risk: usually late and over budget. By using PFI and PPP, the risk is supposed to be transferred to the private sector. Unfortunately—as a host of reports by the National Audit Office (NAO) (http://www.nao.org.uk/) show—the process has not been as effective as the government might have wished. Not only have there been significant problems in costs and completion, but scrutiny of these contracts by the public (and in fact by the NAO) has been difficult due to the commercial confidentiality regime under which they are signed and run. Even supporters of the financing tool have suggested problems:

*As a result of the commercial confidentiality inherent in the PFI process, virtually no informed public debate has taken place on the merits of that scheme. The details have seeped out and the local authority has quashed every request for information or a public debate on the ground that it would breach commercial confidentiality.* (Lock, 1999)

In contrast to rights to confidentiality, there is of course a growing expectation of freedom of information access. Such an FoI approach clashes with rights to keep information in confidence. The guidelines from the UK government on how to treat this clash when dealing with PFI Projects, for example, indicate:

***2.1*** *The "Code of Practice on Access to Government Information" produced by the Cabinet Office (Second Edition 1997) states that: "the approach to release of information should in all cases be based on the assumption that information should be released… except where disclosure would not be in the public interest or would breach personal privacy or the confidences of a third party".*

***2.2*** *To satisfy public accountability and assist in the development of PFI, public sector clients should not misuse the term "commercial confidentiality" as an excuse to withhold information. When public sector clients wish to withhold information on individual PFI projects "for reasons of commercial confidentiality", they should only do so where disclosure would cause real harm to the legitimate commercial or legal interests of suppliers, contractors, the public sector client or any other relevant party."* (Office of Government Commerce, 2005)

However, the FoI Act appears to provide substantial exemptions for commercial partners in the new governmental models:

***43.*** *(1) Information is exempt information if it constitutes a trade secret. (2) Information is exempt information if its disclosure under this Act would, or would be likely to, prejudice the commercial interests of any person (including the public authority holding it). (3) The duty to confirm or deny does not arise if, or to the extent that, compliance with section 1(1)(a) would, or would be likely to, prejudice the interests mentioned in subsection (2).*

The FoI Act in the United Kingdom has not been in force for a sufficiently long period to discover just how this section is being interpreted, but it is one of the most controversial parts of the Act and we might expect it to quite heavily used and, eventually, litigated over in the coming year or two.

## FUTURE TRENDS

There are many reasons to believe that we are only beginning to see trends arising in "public information" access. The value of this information is growing in a number of ways—as economic goods for commercial vendors who wish to add value, as informational goods on citizens who wish to know about their neighbors, and as a valuable resource for government itself as it tries to become more effective and efficient. Thus the value is rising at the same time as is the quantity. And as more becomes available, so the potential value rises again.

While this increase in worth continues, there are pressures to limit access: those who say that the notion of "public" was fine when access was difficult (and that this acted almost as a privacy limitation) are now arguing that we must control access of the public to information, particularly where it concerns individuals.

The worries too about FoI will grow: these rights are based upon knowing what government does, but when government gives orders from above but does less and less, do these rights necessarily apply to the agents of the government?

It is clear that in an information economy where the basic goods are informational they are therefore worth litigating over. It is unlikely that information law will become less complex or have less impact in future years.

## CONCLUSION

Information is the lifeblood of e-government. But while technologists tend to view information as nonproblematical—simply the data upon which they operate and which the new technologies allow to be collected, stored, and processed in aid of efficient and effective government, to the lawyer—viewed through the lens of a variety of legal rights—"information" is a much more complex entity. This is giving rise to the field of information law—the last 10 years have seen significant developments—where the various individual legal rights (privacy, data protection, copyright, etc.) have come together and impact upon the relationship between persons, data about persons, and the processors of that data. Information law thus straddles a gamut of legal fields which are vital to successful e-government implementation. Technologists clearly want to get on with developments and produce systems which work, which are ready on time, and which keep the clients happy. Law, in this view, simply gets in the way of that process, and lawyers are seen as part of the problem rather than part of the solution. However, a different view is that law, particularly with the law of legal information, is an attempt to balance various pressures so that somehow a meaningful and just system is brought into being. This balancing is not easy: the judiciary is not technically competent, it cannot always foresee how its judgments will affect the world or whether they will have wider consequences, and it is too often persuaded by legal fashion rather than empirical evidence.

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## KEY TERMS

**Access to a Fair Trial:** A fair trial is usually one that occurs in public so that it can be witnessed; however, the European Convention on Human Rights (Art. 6) allows this public nature to be set aside in certain situations: "the press and public may be excluded from all or part of the trial in the interests of morals, public order or national security in a democratic society, where the interests of juveniles or the protection of the private life of the parties so require, or to the extent strictly necessary in the opinion of the court in special circumstances where publicity would prejudice the interests of justice."

**Copyright:** Copyright is given to the first author, that is, the person (or employer) who fixes the work. It is a reward for creation. However, copyright law is a maze for the uninitiated. For example, in UK law, a judge who gives a verbatim judgment which produces a taped aural record has fixed the work in one form. However, a transcriber who produces a document from that recording also produces a copyrighted work. This latter is so in the United Kingdom because there is such a low level of creativity required: the United Kingdom is out of step with other common-law countries and also with the rest of Europe. In the United States, the Copyright Act Section 105 specifically excludes government (i.e., federal) materials from copyright protection.

**Database Rights:** If information is not copyright, it is possible for anyone to republish this without constraint. It was felt that this was problematic: companies who expended effort and costs upon building databases could simply see competitors come along and steal the contents of the database. The Database Directive was introduced to resolve this perceived problem. It is not a right that is available in the United States and remains controversial. Part of the criticism is that it is not clear just what is being protected since the contents can change continually and thus protection is basically available on a perpetual basis:

*Art 10(3): Any substantial change, evaluated qualitatively or quantitatively, to the contents of a database, including any substantial change resulting from the accumulation of successive additions, deletions or alterations, which would result in the database being considered to be a substantial new investment, evaluated qualitatively or quantitatively, shall qualify the database resulting from that investment for its own term of protection.*

**Data Protection:** The idea that commercial firms who were selling, storing, and processing information on individuals should be controlled grew in the 1970s and 1980s. The basic idea is that this should only be allowed when consent is given. There is skepticism about the success of these laws, since consent is easily got by, for example, supermarket chains who offer loyalty cards, or by companies who include a consent clause in their contracts. There has been some impact upon public information: in the United Kingdom one must now opt-in to have voter registration data made available to commercial suppliers. This was the result of a complaint under the Data Protection Act. See *R (On the Application of Robertson) V. City of Wakefield Metropolitan Council* [2001] EWHC Admin 915, November 16, 2001.

**Freedom of Expression:** A right to impart and receive information. In Europe this is a weaker right, perhaps, than that of privacy. It is also limited by libel and slander laws, for example. In the United States it is the First Amendment

right and is of much higher importance than in Europe: "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances." (See Findlaw at http://caselaw.lp.findlaw.com/data/constitution/amendment01/ for a very useful overview of interpretation.)

**Freedom of Information (FoI):** The basis for legislation is that the more the citizen knows about how government acts, the better will be the government. Thus various laws have been implemented to allow access to information. However, there is evidence that these laws are not used so much by the public as by commercial firms wishing to know about other commercial firms, for example, who are undertaking governmental work.

**Freedom of Information Exemptions:** Those aspects of public information that have been considered should be excluded from public access. For example, in the United Kingdom: Freedom of Information Act 2000. Section 43:

*(1) Information is exempt information if it constitutes a trade secret. (2) Information is exempt information if its disclosure under this Act would, or would be likely to, prejudice the commercial interests of any person (including the public authority holding it). (3) .... Also see Art 4 of Regulation (EC) No 1049/2001 Regarding public access to European Parliament, Council and Commission documents: "... 2. The institutions shall refuse access to a document where disclosure would undermine the protection of: – commercial interests of a natural or legal person, including intellectual property, ..."*

**Horizontal Effect:** The idea that a law which is directed at governments can be used by citizen against other citizen. Thus the "right to a private life" is an example of a public law (the European Convention on Human Rights) which has, through horizontal effect, become available in private law.

**Personal Data:** Personal data is that which refers to sensitive information about a person. There is no formal definition of this (but it usually includes medical information) and research has demonstrated that it has a cultural aspect.

**Privacy:** Developing European law has given us privacy as a fundamental right. Unfortunately, it is not clear just what is meant by privacy since definitions can cover a gamut of approaches—the right to be left alone or the right to control personal information being two. In the United Kingdom, it has been suggested that the judiciary should utilize the law of confidence to implement privacy. See Lord Woolf in A v B [2002] EWCA Civ 337 (March 11, 2002).

**Public Sector Information:** This is information that (usually) has a commercial usage and that third parties would wish to republish, perhaps with added value. For example, map-based information from government departments could be used as the basis of commercial products if this was available. The European Commission, in its support for an information economy, has been keen to see this type of information become available to republishers.

# Accessibility of E-Government Web Sites

A

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## INTRODUCTION

The Internet has emerged as one of the most prevalent forms of communication. The gathering and sharing of electronic information are becoming essential elements of modern life. Therefore, it is important to ensure that people, especially those with disabilities, have equal opportunities to benefit from the Web, especially from online public services.

While many people describe the Web as a low cost, all encompassing, and far-reaching medium (Parker, 1997), it is really not accessible to everyone. The proportion of people with disabilities in society has been increasing due to the demographic trends long documented by many researchers (Barth, McNaught, & Rizzi, 1993; West, 1998). Nevertheless, government leaders have paid little attention to the needs of people with disabilities when planning and implementing Web projects, and hence many critical online public activities and customer services are not readily available to the disabled. In short, a critical challenge facing all governmental agencies is how to make the massive volume of information being published on public sector Web sites accessible to every citizen they serve.

## BACKGROUND

The Web can be considered as a multifaceted mass medium that contains many different configurations of communication (Morris & Ogan, 1996). As Lynch and Horton (1999) pointed out, the originators of the Web intended the Web to be a device-independent method for exchanging documents across many different platforms. The glue that holds the modern Internet world together is the Web programming language, namely HTML (Hypertext Markup Language). The term "Hypertext" was first coined by Theodor Holme Nelson, a recognized ideologist of Hypertext, in reference to a radically new way of storing and viewing information. Instead of gathering or retrieving information sequentially, information recorded with Hypertext is fashioned in multiple layers. An automated index is built into the Web document. The intertextuality and non-linearity of HTML enable Web pages to connect various virtual contents with specific "links" which allow online users to move among points and "nodes" (Howell, 1992).

The use of Web technology often has particular potential benefits for many people with disabilities. For example, for people who are visually impaired, the earlier text-based Internet sites opened a world of information that was previously off-limits. "For the first time in history, it is now possible for many people with disabilities to get information right from its original source (rather than waiting for Braille translations, etc.)" (Christensen, 2001, p. 30).

Unfortunately, with their focus on structuring and sharing documents, the originators of the Web ignored the visual logic or graphic design aspects of Web information delivery that are now stymieing blind users today. Due to the fact that the Web continues to increasingly embrace colors, graphics, motion pictures, audio, and the other dynamic elements, the current Web design practices have caused more difficulties for disabled individuals trying to benefit equally from society. A recent study shows that the usability of most current Web sites is on average three times higher for users without disabilities than for those who are blind or have low vision (Nielsen, 2001). Another research project published by Forrester Research (Souza & Manning, 2000) found that only one in four e-commerce sites it surveyed met even minimum requirements provided by the Web Accessibility Initiative (www.w3.org/WAI/) for disabled Web users, such as providing text descriptions of images for the blind. Waddell (1998) calls the Web "the growing digital divide in access for people with disabilities." Even in the public sector of the U.S., where Web accessibility is legally mandated, a significant number of official Web sites still contain features that do not provide reasonable access to disabled users (Gant & Gant, 2002).

Web pages are more than printed pages posted electronically. The Web offers many new opportunities as well as challenges to modern organizations (Mitra & Cohen, 1999; Parker, 1997). First of all, the Web makes it easy to transmit information in a timely fashion. Changes to a Web site can be published in a relatively short time when compared to the lengthy processes of redesigning, production, and distribution processes that are necessary for most printed media. Secondly, Web pages can

include larger amounts and a greater variety of information without incurring major printing and distribution costs. On the Web, costs do not necessarily increase as the amount of information being communicated increases. Furthermore, multimedia objects, including drawing, photographs, animation, sound, video, and computer applications, can be incorporated into Web pages at a low cost to enhance the Web's communication effects.

One Web characteristic that sets Web development apart from traditional media design is the lack of control. Unlike designers of printed media, a Web designer somewhat loses control over how online users will browse through the pages, the appearance of the fonts and colors used on a page, and the size, proportions, and exact locations of the different Web texts. On the Web, users largely determine their own navigation paths, and they are free to "jump" to any location that interests them. In addition, designers cannot know the exact computer equipment that the various potential users have, or what fonts and software have been installed in the users' computers. The exact way WWW pages present information would be partly determined by the users' own environment.

Therefore, Web content should ideally be designed in a way that the users using different agents (for example, desktop computers, mobile phones, televisions, PDA, etc.), with different Web browsers (for example, Lynx, Netscape Navigator, Internet Explorer…), and under different constraints can all access. In short, Web accessibility is not only concerned with disabilities, but also with the ideal that anyone using any kind of Web browsing technology can access and get full and complete information within it (Letourneau, 2000).

## REASONS FOR PROVIDING WEB ACCESSIBILITY

There are more than 750 million people with disabilities worldwide. As noted earlier, at a time when the number of people with disabilities is increasing as the population ages, our society has become one that depends more and more on computers and digital technology for work, education, and entertainment. Participating in the digital economy by definition requires the ability to access and use the Web. It is hence important to make every possible Web site accessible. As the director of World Wide Web Consortium and inventor of the Web, Tim Berners-Lee (http://www.w3.org/WAI/), stated, "the power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

In addition to common human decency, the most obvious reason to make governmental Web sites accessible to the disabled is to comply with the law. The Americans with Disabilities Act (ADA), Section 508, and similar laws and regulations in other countries (Paciello, 2000, p. 39-44) often mandate the establishment of means to allow the disabled access to the same information and use of the same tools as anyone else on the Web. For example, the ADA requires "reasonable accommodations" and "effective communication" in areas of employment, public services, and telecommunication services. With the popularity of e-government and e-commerce, the foci of the law have changed to include the Internet (Sager, 2000). Section 508 of the Rehabilitation Act defines the processes used by the federal government to procure electronic and information technology. One of the most important foci of the law is to ensure access to electronic and information technology made available to people with disabilities who are federal employees or members of the general public. In Canada, the Equity and Diversity Directorate of the Public Service Commission was the first national institution to publish Web accessibility guidelines to ensure that all governmental Web pages and associated electronic data was accessible to every Web user.

Although most countries in the world have not yet developed specific laws or regulations regarding Web accessibility, many have enacted legislations and governmental regulations similar to the ADA of the U.S. Until recently these laws and regulations are mainly concerned with the topics of employment, transportation, and public facilities. However, it is only a matter of time before most governmental Web sites worldwide come under political and legal challenges for not being accessible to the disabled. It seems likely that in time the Web-based services will be held to the same standards as the services or facility architecture of the physical world in the courts.

Moreover, making a Web site so accessible could be a competitive advantage economically. Many companies have found that creating accessibility on their Web sites is cost-effective and generally good business practice (Solomon, 2000). According to a report published by Forrester Research (Souza, Manning, & Dorsey, 2001), Global 3,500 companies are estimated to spend $560 million to retrofit their Web sites to meet W3C Web Accessibility Initiative guidelines. E-commerce companies, such as Amazon.com, are making their Web sites accessible so as to gain a share of the $175 billion in discretionary income controlled by consumers with disabilities (Amazon.com's press release December 6, 2001; Prager, 1999). Sixty-eight percent of consumers between 45 and 54 years old are online and nearly one-fourth have a disability (US Census). The authors conclude: "Companies must plan site design projects keeping people with disabilities in mind. Doing so is cost-effective—especially if accessibility is part of the planning, development, and maintenance process."

Indeed, disabled Web users often become very loyal customers once they find a Web site that accommodates their special needs (Nielsen, 2000; Rogers & Rajkumar, 1999). Accessible Web design also enables low technology to access high technology. More specifically, accessible Web design features enable video and audio elements on the Web to be archived with word search capabilities, and text to be converted into speech by screen readers, and hence senior citizens, people in underdeveloped countries, and even those who are illiterate are also likely to benefit from accessible Web design, since the Web text can be simultaneously presented auditorily through a voice synthesizer. On the other hand, organizations that do not make their Web sites accessible to people with disabilities are not only missing out on marketing opportunities but also facing further financial pitfalls from civil rights organizations pursuing litigation (Kautzman, 1998).

Once the large commercial Web sites in the private sector are accessible, people with disabilities will come to expect the same online relationship with government agencies as that they have with businesses. For agencies at all levels of government, the Internet provides an ideal medium to the citizens who used to be relatively alienated from many public services. However, the current government Web site planners and production staff are often not aware of the critical importance of this issue and hence erect various barriers between their online services and the disabled constituents (Gant & Gant, 2002; Office of Government Services, 2002).

## FUTURE TRENDS

To promote interest in Web accessibility, several hardware and operating system developers, non-profit assistive technology developers, and application software manufacturers have worked to make equal access to the Web possible. The World Wide Consortium (W3C) launched the Web Accessibility Initiative (WAI) in April 1997. Under the direction of The WAI International Program Office director, the WAI team has developed an in-depth and detailed set of Web Content Accessibility Guidelines (WCA Guidelines 1.0; http://web1.w3.org/TR/WAI-WEBCONTENT/), and associated checklists.

The WCA Guidelines address two general themes: ensuring graceful transformation to accessible designs, and making content understandable and navigable. They are composed of fourteen specific guidelines, with each including the rationale behind the guideline and a list of checkpoint definitions. Each checkpoint is assigned a priority level by the WAI Team based on the checkpoint's impact on accessibility. Specifically, Web pages must meet the requirements of priority 1 guidelines. **O**therwise, one or more groups of users will find it impossible to access the information in the Web page. Priority 2 indicates that Web content developer should satisfy this checkpoint or one or more groups will find it difficult to access information in the document. Finally, Priority 3 means that a Web content developer may address this checkpoint to improve access to Web documents.

The WCA guidelines are recognized as the authority for designing and creating accessible Web sites, and have been used by several software developers to develop accessibility authoring and checking tools (Tillett, 2001). For example, BOBBY (www.cast.org/bobby/), whose design is based on the W3C Accessibility Guidelines for Page Authoring, is provided as a free online service to analyze single Web pages for their accessibility to people with disabilities. Macromedia also joins the effort by providing an online checking tool to help Web producers create accessible Web sites.

Overall, making a Web site accessible does not mean minimal Web page design. "The focus is to promote the design of Web sites that are highly usable for the greatest number of surfers" (Paciello, 2000, p. 50). A Web site designed for accessibility usually enhances its usability for all people, regardless of ability.

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## KEY TERMS

**Assistive Technology:** Software as well as hardware for people with disabilities who find operating a computer difficult. As examples, these technologies include speech recognition, screen reader, touch screen, mouse alternatives, keyboard with large print keys, etc.

**Dimensions of Web Accessibility:**

a. Web sites and applications on the Web
b. Web browsers and media players
c. Web authoring tools, and evolving Web technologies

**Priorities of Web Accessibility Conformance:** The WCA Guidelines are composed of fourteen specific guidelines, with each including the rationale behind the guideline and a list of checkpoint definitions. Each checkpoint is assigned a priority level by the WAI Team based on the checkpoint's impact on accessibility. Specifically, Web pages must meet the requirements of priority 1 guidelines. Otherwise, one or more groups of users will find it impossible to access the information in the Web page. Priority 2 indicates that Web content developer should satisfy this checkpoint or one or more groups will find it difficult to access information in the document. Finally, Priority 3 means that a Web content developer may address this checkpoint to improve access to Web documents.

**Web Accessibility:** It can be defined as usability of the Web for people with disabilities, or, using the definition of World Wide Web Consortium, "access to the Web by everyone, regardless of disability."

**Web Content Accessibility Guideline (WCAG):** WCAG was developed by the World Wide Web Consortium (W3C) to explain how to make Web content accessible to people with disabilities and to define target levels of accessibility.

# Accessible E-Government through Universal Design

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## INTRODUCTION

The accessible design of e-government ensures that these offers can also be used by people with disabilities (accessibility). Moreover, experience shows that clarity and comprehensibility of the offers benefit from their careful and deliberate design and structuring while keeping in mind accessibility requirements. Therefore, accessibility is useful for all citizens who want to attend to their administrative issues via the Internet (universal design).

Accessibility as a cross-sectional subject has to be considered holistically: On the one hand, following the "universal design" principle, it becomes clear that all users benefit from an accessible solution, independent of their abilities and independent of their situation, environment or conditions.

On the other hand, especially in e-government, the complete business process has to be considered: An offer accessible in itself may not be usable if an installation routine or plug-in has to be loaded from a non-accessible page or if the work procedure involves a media break.

## BACKGROUND: ACCESSIBLE E-GOVERNMENT AND HANDLING OF MEDIA BREAKS

Handicapped citizens as well as handicapped employees of the administration benefit from accessible e-government. When implementing e-government applications, there are three substantial areas of requirements where the principles of accessibility have to be considered.

1. **Access:** It has to be ensured that all citizens are generally able to use the application, at home, the workplace or a public access place. It has to be ensured, for example, that a person with a walking impairment can enter a public access location. For a Web site, it is crucial to make the pages accessible for people with disabilities and compatible with assistive technologies. Besides these criteria, which concern hardware, software and constructional issues, an important question is whether the citizens are sufficiently competent to use the media: Do they know what the application offers? Can they judge if the application is trustworthy concerning privacy and security? This means that media competence trainings should also be designed for persons with disabilities.
2. **Vertical Integration:** This area of requirements deals with processing in the administration. E-government makes it possible to think over and change traditional processes. Probably, people with disabilities could take over new tasks at their workplace, which may mean more independence from work assistance or help by colleagues.
3. **Horizontal Integration:** Up to now, normally you will have to visit several administrative agencies and fill in various forms if your life changes; for example, if you move or a child is born. E-government is a genuine added value for citizens if the services are offered in a bundle. From the point of view of the citizen and especially the handicapped citizen, the successful horizontal integration of services clearly is a facilitation and reduces the effort required now.

## TARGET GROUPS

Users with different abilities and skills strongly benefit from the accessible design of Internet offers; respectively, they are excluded from use if their requirements are disregarded.

Blind people depend on screen readers reading the monitor content to them, and a Braille display can give additional help. As the information on navigation and orientation can mostly be understood auditively—that is, linearly—a Web site must be structured very clearly. Therefore, all graphic elements must be accompanied by descriptive texts; it should be possible to use every Web site via keyboard.

Visual impairments can differ significantly. They range from diffuse vision, only light-dark contrasts, tunnel vision and sensitivity concerning lighting conditions to color blindness. Transition into the group of the blind is fluid. Often, magnification software and voice output are combined. With software products, it is important that the font is scaleable and that colors can be individually adjusted. In case of strong magnification, large monitors support orientation.

People with mobility impairments—for example, spasticity—can hardly use a mouse or standard keyboard. Persons who are not able to fully use their arms or hands rely on alternatives; for example, special keyboards, head mice, buttons. Clear design and reasonable input linearization are indispensable also for this group.

People with hearing impairments encounter barriers when audio services and videos are provided without a text version. A great difficulty is an overly complex language, especially when the "mother tongue" is sign language and the spoken (respectively, written) language has to be considered as a foreign language. Therefore, it is important to present the relevant information in sign language films or in easy language.

People with cognitive impairments need a memorable page structure, a manageable navigation and easy language (e.g., plain English). Graphic and animated objects support attention.

People who need more orientation—for example, the elderly or people without Internet experience—also need a clear page structure and manageable navigation.

In principle, people who are temporarily handicapped experience the same barriers by a certain situation, such as the handling of a machine, strong backlight or noise. With alternative output units, such as PDAs or mobile phones, orientation and navigation requirements also have to be considered.

Knowing and understanding users' needs facilitates the use of existing standards and guidelines.

## GUIDELINES

With the support of a European Union (EU) research program, the Web Accessibility Initiative (WAI) of the Worldwide Web Consortium (W3C) developed the WAI Guidelines (www.w3.org/WAI). In 1999, the Web Content Accessibility Guideline 1.0 (WCAG 1.0), with 66 checkpoints, was adopted (Chisholm, 1999). It is mainly concerned with the design of Hypertext Markup Language (HTML)-based Internet offers (e.g., the handling of tables, strict separation between presentation and layout, handling of graphic and acoustic elements). Further WAI guidelines deal with authoring tools, user agents and Extensible Markup Language (XML). Additional guidelines of associations, self-advocacy groups and individuals are normally based on the WCAG 1.0.

Discussion of the WCAG 2.0 is still in progress (see Caldwell, 2004; Peter & Schulte, 2005). With its four principles (perceivable, operable, understandable, technically robust), it is more clearly structured than the WCAG 1.0 and independent from technology when formulating criteria. Checkpoints substantiate the principles; for example, to ensure that the Web site is perceivable, it includes checkpoints concerning the requirements of people with low vision as well as those with hearing impairments.

Besides, there is the international standard ISO/TS 16071 (Ergonomics of human-system interaction—guidance on accessibility for human-computer interfaces), which has not attracted much attention until now. It deals with software products in general. Currently, a further standard is being prepared.

The standards on software ergonomics, especially DIN EN ISO 9241 (Ergonomics requirements for office work with visual display terminals), contain requirements concerning accessibility; respectively, design for all. But in the implementation of the norm, these requirements are not sufficiently considered nor adequately operationalized.

Due to legal framework conditions, especially U.S.-American companies developed in-house guidelines following the WCAG 1.0 and offer functions and APIs that make their products more accessible.

## LEGAL BACKGROUND

The objective of accessible information and communication technology (ICT) has been laid down by law in many countries: in the US, the Rehabilitation Act, Section 508; in Europe, for example, the Communication of the European Commission from September 25, 2001. From the end of 2001 on, all member states and the European institutions take the WCAG 1.0 into account for all public tenders. So the WCAG 1.0 is used for making concrete regulations at the legislative level.

## FUTURE TRENDS: ACCESSIBILITY IN PROGRESS

Ensuring accessibility is a difficult demand due to the complexness of the subject. Therefore, it is necessary to focus on the process. A good method is dialog with and among the people with disabilities and the joint development and dissemination of innovative approaches.

In Europe, the European Design for All e-Accessibility Network (EDeAN) coordinates the activities of member states (www.e-accessibility.org). Several activities inform the public about the importance of the subject. One example is the BIENE Award organized in Germany (www.biene-award.de). This award is given to best-practice cases of accessible Web applications in the fields of e-commerce, e-government, media, education, science and research, as well as culture and society. The evaluation process comprises complex expert reviews and final practice tests with users with different disabilities. The popularity of this purely ideal award clearly shows that awareness has increased (see Pieper, Anderweit, Schulte, Peter, Croll, & Cornelssen, 2004).

## CONCLUSION

It is necessary to design Internet applications according to the requirements of target groups to make them attractive for heterogeneous user groups. To reach this aim, guidelines and laws are required, but not sufficient. Only the knowledge of what people with disabilities need and the continuous communication with users accompanying the process will ensure accessible design. Applications in the field of e-government are examples. There are several best practices of information offers, but the transfer is still missing. Moreover, the subject of applications including complex transactions is a question of present and future research.

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## KEY TERMS

**Accessibility:** An information and communication offer is barrier-free and accessible if it does not—by its design, programming or using inappropriate technologies—exclude anybody from its use.

**Universal Design/Design for All:** The principle of the universal design involves more than just the effort on accessibility for people with disabilities. It means that products are designed flexibly so they can be used by everybody. It should be possible to use the product independently of a person's abilities, situation and environment without additional assistive technologies.

**Assistive Technologies:** All kinds of help tools—hardware and software—required for people with certain disabilities.

**Web Accessibility Initiative (WAI):** The WAI of the W3C pursues accessibility of the Web through five primary areas of work: technology, guidelines, tools, education and outreach, and research and development. The W3C develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication and collective understanding.

# Accessing Administration's Information via Internet in Spain

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## INTRODUCTION

Information in the hands of public administrations plays a fundamental role in developing democracies and carrying out daily tasks—not only the public administrations' tasks, but also those of the general public and companies (European Commission, 1998). New information and communications technologies (ICT) are vastly increasing the range of information in the hands of the general public and considerably diversifying both quantitatively and, above all, qualitatively the tools for conveying this, with the Internet being the means chosen by Organisation for Economic Co-Operation and Development (OECD) Member States to provide the general public with access to the information held by the administration (OECD, 2003).

Nowadays, public administrations create, collect, develop and disseminate large amounts of information: business and economic information, environmental information, agricultural information, social information, legal information, scientific information, political information and social information.

Access to information is the first step towards developing e-governments and is something that has grown most in recent years, not only from the viewpoint of supply but also of demand. At present, most people using e-government do so to obtain information from public administrations.

Throughout history, information has not always had the same relevance or legal acknowledgement in the West.

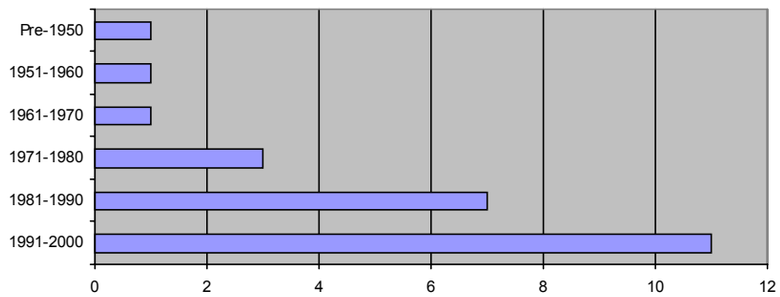
Bureaucratic public administrations had no need to listen to the general public nor notify citizens of their actions. Hence, one of the bureaucratic administration's features was withholding the secret that it had legitimized, since this was considered the way to maintain the traditional system of privileges within the bureaucratic institution—by making control and responsibility for information difficult, and also by allowing the public administration to free itself of exogenous obstacles (Arteche, 1984; Gentot, 1994). In most European countries, except the Nordic countries (Sweden, Norway, Finland), secrets were the dominant principle. For instance, it was not until 1978 that France passed a law concerning access to public sector information; in 1990, Italy did likewise.

Crises in the bureaucratic model of public administration have brought with them the existence of new models. Receptivity, focusing on the client and quality management, have been some responses to the crisis of this model in the 1980s and 1990s, since the advent of the post-bureaucratic paradigm ( Mendieta, 1996; Behn, 1995). The process of modernizing Public administrations has meant that those governed have come to be considered clients of these administrative services (Brugué, Amorós, & Gomà, 1994). Citizens, considered as clients, now enjoy a revitalized status as seen from public administrations, which provides citizens with a wide range of rights and powers in order to carry out their needs, including obtaining information from the administration (Chevalier, 1988). This process has coincided over the years with the rules regulating access to public-sector information being extended in countries of the West.

But the evolution does not stop here. Societies that are pluralist, complex and interdependent require new models of public administration that allow the possibility of responding and solving present challenges and risks (Kooiman, 1993; OECD, 2001b). Internet administration represents a model of public administration based on collaboration between the administration and the general public. It has brought about a model of administration that was once hierarchical to become one based on a network in which many links have been built between the different nodes or main active participants, all of whom represent interests that must be included in the scope of general interest due to the interdependence existing between them (Arena, 1996).

The way the administration is governed online requires, first and foremost, information to be transparent, with the aim of guaranteeing and facilitating the participation of all those involved (European Commission, 2001). It is essential that all those involved in the online process are able to participate with as much information as possible available. Information is an indispensable resource for decision-making processes. The strategic participants taking part in these will consider the information as an element upon which they may base their participation online. Information becomes a resource of power that each participant may establish, based on other resources

*Figure 1. First introduction of regulations concerning access to information in OECD member countries (Source: OECD, 2001a)*




he or she has available, and this will influence their strategies in the Internet. This allows us to see that the networks distributing information may be asymmetrical, which leads to proposing a need to adopt a means to confront this asymmetrical information. In this task, ICT can be of great help with the necessary intervention of law.

Public-sector information has an important role in relation with citizens' rights and business. Public administration also needs information to achieve its goals.

## E-GOVERNMENT AND PUBLIC SECTOR INFORMATION

The use of the Internet has increased access to information held by public administrations. Any citizen, regardless of where they are, can access any information in the hands of the public administration 24 hours a day, 7 days a week just by accessing the public administration's Web site (OECD, 2003a).

This is not exclusive to just one country, but throughout Europe and, generally speaking, worldwide, where considerable efforts are being made to raise the amount and quality of administrations' information in Internet. This has also happened when adopting strategies and further documents related to the administrations' information on the Internet. Thus, for example, on January 16, 1998, in France, the Interministerial Commission for the information society put forward a document entitled *Préparer l'entrée de la France dans la société de l'information* in which it was highlighted that the state, as the leading producer of information in the country, had to extend the distribution of information via Internet. Other documents of the same sort are the *United Kingdom's White Book on the Freedom of Information* and the memorandum from the Netherlands, *Towards the Accessibility of Public Information*. The relevance of access and the use of information from the public sector has been widely highlighted also in the sphere of the European Union. For example, in the Council's Decision 2001/48/EC, dated December 22, 2000, which adopted a Europe-wide program spanning several years that aims to stimulate the development and use of European digital information in the World Wide Web and promote the linguistic diversity in the information society, it has led to the approval of rules, such as Directive 2003/98/EC, regarding the reutilization and exploitation of documents from the public sector.

Access to information in the hands of public administrations allows the general public to exercise its rights and activities. Furthermore, access to information allows an introduction into the market of an asset with a high economic content, which may be the object of commercialization and reutilization.

However, in order that the information the general public accesses fulfils these functions ideally and thus be seen by the general public likewise, it is essential that this information fulfil certain standards. In particular, information must be thorough, objective, trustworthy, reliable, relevant and easy to find, understand and use (OECD, 2001a).

The OECD has confirmed the general use of new ICT on an international level, stating that the options most used by public administrations with the aim of making this information available are Web sites (the number of governmental bodies with Web sites has reached around 80% in the countries taking part in the survey carried out by PUMA in 2000), portals (many OECD countries have created single points of access to facilitate access to information for the general public), search engines, minutes from meetings, kiosks (some countries offer the possibility of accessing the Internet by installing access points in public offices) and CD-ROMs for consultation off-line (OECD, 2001a).

*Table 1. Have you ever contacted the public administration via Internet? (more than one answer possible). (Source: European Commission [Flash Eurobarometer 125])*

| | Finding administrative information | Sending e-mails | Filling out forms | Other reasons | Never contacted this via Internet | Don't know |
|---|---|---|---|---|---|---|
| UE 15 | 37 | 23 | 27 | 2 | 49 | 2 |
| Belgium | 32 | 37 | 23 | 0 | 45 | 4 |
| Denmark | 53 | 34 | 42 | 2 | 34 | 1 |
| Germany | 34 | 21 | 28 | 1 | 50 | 2 |
| Greece | 22 | 16 | 12 | 1 | 65 | 1 |
| Spain | 41 | 13 | 14 | 0 | 55 | 1 |
| France | 48 | 27 | 31 | 1 | 41 | 0 |
| Ireland | 25 | 19 | 18 | 0 | 64 | 1 |
| Italy | 36 | 15 | 16 | 0 | 58 | 1 |
| Luxembourg | 44 | 26 | 19 | 0 | 47 | 1 |
| Netherlands | 44 | 22 | 30 | 0 | 43 | 1 |
| Austria | 32 | 25 | 22 | 0 | 51 | 7 |
| Portugal | 27 | 14 | 21 | 0 | 59 | 1 |
| Finland | 30 | 19 | 30 | 1 | 56 | 1 |
| Sweden | 64 | 57 | 53 | 0 | 20 | 1 |
| UK | 27 | 26 | 30 | 9 | 53 | 3 |

## THE LEGAL REGIME CONCERNING ACCESS TO INFORMATION VIA INTERNET IN SPAIN

Analysis of the legal regime concerning access to information in the framework of e-government poses a difficulty from the outset: At present, there have not been any generally adopted regulations regarding access to information using new technologies. In fact, there are very few regulations that entirely cover access to public-sector information using new technologies. Perhaps the first and best known of these is the one developed by the United States (U.S.) Congress in 1996 with the amendment of the *Freedom of Information Act*, known as the *Electronic Freedom of Information Act* (EFOIA).

This has given rise to the fact that there is no clearly defined legal regime in Spain allowing the means to be determined whereby information can be accessed, what type of information can be offered to the public and the characteristics and conditions of this access and use, and the means providing guarantees, price and responsibility for the contents of information, among other items.

This lack of defining important details in the legal regime and, in many cases, the non-existence of a suitable means to guarantee compliance with the right to access administrative information, could lead to inefficacy, inefficiency and asymmetry which, in the end, may prevent it from fulfilling the functions information is expected to provide in this present day (Torrijos, 2001; OECD, 2001).

In spite of this, analyzing the present legislation in Spain will allow us to contribute some details regarding what kind of legal regime should exist concerning access to information in Spain. Law 30/1992, November 26, concerning the legal regime of public administrations and common administrative procedures (hereinafter LRJPAC), acknowledges a list of rights of the general public regarding its relation with public administrations. From the list of citizens' rights provided, four refer to citizens' public-sector information (Cerrillo i Martínez, 2000):

- The right to ascertain the stage at which the documents are being processed.
- The right to know the identity of the authorities and personnel working for public administrations.
- The right to obtain information regarding legal or technical requirements.
- The right to access administrative files and registers.

Without going into great detail by evaluating the extent of these rights, it can be seen that we are faced with real subjective rights (Cerrillo i Martínez, 2000). The acknowledgement of these rights to obtain public sector information implies, on the one hand, the particular obligation to provide information held by the administration, following a relevant request by a citizen and, on the other, the general duty is established for organizing the relevant services to provide this information to the general public (Cerrillo i Martínez, 2000).

Their contents are focused, on the one hand, on general public-sector information (information concerning legal or technical requirements regarding projects, actions or applications and information concerning docu-

ments in archives and registers). Accessing this information does not require any special legitimization. Any citizen can access this information. On the other hand, private administrative information that concerns specific procedures is only available to interested parties (Cerrillo i Martínez, 2000).

Following the approval of the LRJPAC, the regulation concerning information has been increased; first, with rules being introduced in certain sectors involved in this activity (health, education and environment, to mention a few) (Cerrillo i Martínez, 1998) and, in addition to this, rules have been passed establishing the necessary infrastructure to carry out this function.

On a state level, the Royal Decree 208/1996, February 9, regulating services concerning administrative information and attention provided to citizens, establishes the organization, operation and coordination of administrative services, which focuses its work on the tasks of providing information to citizens (Cerrillo i Martínez, 2000). The Royal Decree 208/1996 provides for different means citizens can use to access information by specially highlighting the means of supplying information personally without specifically incorporating the use of the Internet as a means for making information public. However, this regulation makes no mention either of the legal position of the citizen regarding this information or the characteristics or conditions in which the public administrations must carry out this task concerning the information, or other aspects, such as the quality of this information or the service provided.

The rules regulating e-government in Spain do not allow us to overcome the aforementioned lack of resources. On reading the rules regulating e-government, both on a state level and in regions that have already passed some regulations on this matter (Aragón, Valencia region, Madrid region, Extremadura or Catalonia), this will allow us to see that more than simply establishing new citizens' rights in their relationship with the public administrations, they provide new means to exercise the rights previously recognized under other regulations (see article 45 of LRJPAC). There is no general law for the general public to contact the public administration via data transmission and, in particular, to gain access to information in the hands of the administration via this system (Torrijos, 2001).

## FUTURE TRENDS: TOWARD A NEW LEGAL REGIME

Over the years, access to information has grown and been extended until reaching the present situation, which is mainly characterized by the fact that it is the public administration that offers or distributes the information without citizens having to request or apply for it. In other words, passive access to information is now becoming active access. Following article 1 of Directive 2003/4/EC, January 28, on public access to environmental information:

- Passive access is that which arises when a request is made by a citizen for the public administrations to provide a document or item of information. Directive 2003/4 establishes that "Member States shall ensure that public authorities are required … to make available environmental information held by or for them to any applicant at his request and without his having to state an interest."
- Active access is that which is guaranteed via generalized distribution of information through the creation of information distribution systems carried out by the public authorities. Directive 2003/4 establishes that, as regards the distribution of information, "Member States shall take the necessary measures to ensure that public authorities organize the environmental information which is relevant to their functions and which is held by or for them, with a view to its active and systematic dissemination to the public, in particular by means of computer telecommunication and/or electronic technology, where available."

The transition from one type of access to information to another may be seen, to a certain extent, as being caused or even highlighted by the general use of new ICT, since these offer means for searching, selecting, integrating and distributing large quantities of information in the hands of the public administrations as well as facilitating the presentation of the findings in such a way that it may be used by citizens (OECD, 2001a).

From the legal viewpoint regarding access to information, if passive access was sufficiently guaranteed with the recognition of the right to access this public-sector information as a subjective citizens' right, active access also means that it is necessary to establish a service in charge of distributing and making the information public with thorough guarantees for citizens provided by the use of new ICT.

But the public administrations' duty to create information services is not enough in itself. We believe that at present, active access cannot be exclusively guaranteed by creating infrastructures services concerning the distribution of information (in the organic or functional sense); it is also necessary to recognize these as being a service of general interest (Lasserre, 2000; European Commission, 2004). In this way, a minimum content can be guaranteed that may be summarized by the following details: universal service, continuity, quality of service, accessi-

bility and protection of users (European Commission, 2004). But, on the whole, it will allow a guarantee that the distribution of this information fulfils certain characteristics that will allow citizens, in the end, to exercise their rights and companies to carry out their business activity, thereby overcoming most of the difficulties and limits the acknowledgement of the right to access as a subjective right has had so far.

This situation has been reached in a number of countries. For example, in France, Law 2000/321, April 12, regarding citizens' rights covering contacts with the administration, has provided for the distribution of information via Internet to be considered a public service.

The conclusion above, however, does not stem from the public administration being the only one that can distribute information to citizens. Although it is true that public-sector information is important for a civil and democratic society, it is also potentially important from a financial viewpoint. That is why public administrations can distribute *information linked to public service missions* (legal information, information concerning the services it provides) and also information with added value (weather forecasts, statistics, tourist information, for example) that could compete with companies and citizens, as in the case, for example, of Directive 2003/98/EC regulating the reutilization and commercial exploitation of documents belonging to the public sector.

In Spain, information services regulation is not only a power of the state, but also a power of the autonomous communities (regions) and municipalities that can develop their own information services within the framework laid down by the state.

## CONCLUSION

Access to information plays an important role since, on the one hand, it allows democratic legitimacy of governments to be increased and, on the other hand, helps citizens to become active participants, and not just reactivating citizens, in public affairs. Furthermore, and as a consequence of the points mentioned above, access to information is based on a means by which is highlighted the principle of the public powers' accountability.

New technologies facilitate access to information held by public administrations, making large amounts of information available to citizens and companies. However, it is necessary for the citizen to be sure that all information is included and that public administration does not fail to provide information that may cause itself problems.

Law plays an important role in this by establishing the framework in which the information is provided by the public administrations; guaranteeing effective access, available to all, with a minimum level of quality and also easily accessible; and avoiding the existence of asymmetrical information between different participants.

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## KEY TERMS

A

**Access to the Administrations' Information:** The right to acknowledge information held by a public administration.

**Active Access:** Access to information made available and disseminated to the public by the public administration to achieve the widest possible systematic availability and dissemination of administrations' information. To this end, the use, in particular, of computer telecommunication and/or electronic technology.

**Information Held by a Public Administration:** Information in its possession that has been produced or received by that authority.

**Passive Access:** Access to information that provide the information regarding public administration after it has been requested by a citizen.

**Public Administration:** Government or other public administration, including public advisory bodies, at national, regional or local level.

**Service of General Interest:** Covers both market and non-market services the public authorities class as being of general interest and subject to specific public service obligations; in particular, universal service, continuity, quality of service, affordability, as well as user and consumer protection.

**Transparency:** Quality of public administration when citizens are able to know what is happening inside.

# Adopting and Implementing Telehealth in Canada

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## INTRODUCTION

Canada spans 9,976,140 square kilometers and has an approximate population of 32 million people (Statistics Canada, 2001). More than 90% of Canada's geography is considered rural or remote (Government of Canada, 2001). Despite the highly dispersed population, and, indeed, because of it, Canada is committed to the idea that a networked telehealth system could provide better access and equity of care to Canadians. Growing evidence of the feasibility and affordability of telehealth applications substantiates Canada's responsibility to promote and to develop telehealth.

Telehealth is the use of advanced telecommunication technologies to exchange health information and provide healthcare services across geographic, time, social, and cultural barriers (Reid, 1996). According to a systematic review of telehealth projects in different countries (Jennett et al., 2003a, 2003b), specific telehealth applications have shown significant socioeconomic benefits to patients and families, healthcare providers, and the healthcare system. Implementing telehealth can impact the delivery of health services by increasing access, improving quality of care, and enhancing social support (Bashshur, Reardon, & Shannon, 2001; Jennett et al., 2003a). It also has the potential to impact skills training of the health workforce by increasing educational opportunities (Jennett et al., 2003a; Watanabe, Jennett, & Watson, 1999). Therefore, telehealth has a strong potential to influence improved health outcomes in the population (Jennett et al., 2003a, 2003b).

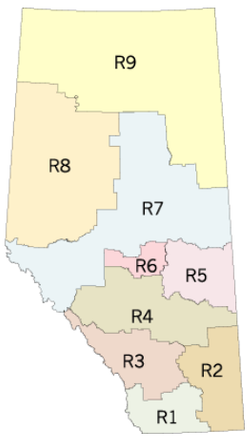
Fourteen health jurisdictions—one federal, 10 provincial, and three territorial—are responsible for the policies and infrastructure associated with healthcare delivery in Canada. This article presents a telehealth case study in one of Canada's health jurisdictions—the province of Alberta. The rollout of telehealth in Alberta serves as an example of best practice. Significant milestones and lessons learned are presented. Progress toward the integration of the telehealth network into a wider province-wide health information network also is highlighted.

## BACKGROUND

Canada's province of Alberta has a geography that is well suited to using telehealth technologies. Previous telehealth pilot projects throughout the province provided evidence of potential benefits from telehealth applications (Doze & Simpson, 1997; Jennett, Hall, Watanabe, & Morin, 1995; Watanabe, 1997). Alberta is the westernmost of Canada's prairie provinces with a total area of 661,188 $km^2$. Approximately 3 million people live in this western province, with two-thirds of the population living in two major cities in the lower half of the province; 19.1% of the population is distributed over the northern remote areas and southern rural communities (Figure 1) (Alberta Municipal Affairs, 2004; Statistics Canada, 2001).

In Alberta, health regions assume responsibility for acute care facilities and continuing and community-based care facilities, including public health programs and surveillance. The population sizes of health regions vary, as do their service census populations (Figure 1). The province has approximately 100 hospitals and more than 150 long-term care facilities. Health professionals are located largely in the urban centers, leaving many rural and remote areas with limited access to a variety of healthcare providers and services. In the mid-1990s, there was a physician-to-population ratio of 1:624 (Alberta Health, 1996). Most

*Figure 1. Health regions in Alberta (Government of Alberta, 2004)*




| Health Region | Region # on Map of Alberta | Population* | % of Alberta Population | # of Videoconference Sites |
|---|---|---|---|---|
| Chinook | R1 | 152,636 | 4.9 | 8 |
| Palliser | R2 | 98,074 | 3.1 | 9 |
| Calgary | R3 | 1,122,303 | 35.9 | 34 |
| David Thompson | R4 | 286,211 | 9.2 | 27 |
| East Central | R5 | 109,981 | 3.5 | 10 |
| Capital Health | R6 | 978,048 | 31.3 | 28 |
| Aspen | R7 | 176,580 | 5.7 | 18 |
| Peace Country | R8 | 130,848 | 4.2 | 24 |
| Northern Lights | R9 | 69,063 | 2.2 | 16 |
| **TOTAL** | | **3,123,744** | **100** | **174** |

**Population listed is as of April 1, 2003, except R3 & R4, which were updated December 1, 2003.*

physicians are compensated on a fee-for-service basis by the provincial government (Alberta Health, 1997).

During the last decade, health reforms and restructuring have taken place in Canada, both at the federal (Kirby, 2002; National Forum on Health, 1997; Romanow, 2002) and provincial (Clair, 2000; Fyke, 2001; Mazankowski, 2001; Ontario Health Services Restructuring Commission, 2000) levels. These reforms were conducted in response to important trends challenging the Canadian Medicare system, such as escalating costs for new technologies and drugs, aging population, and increasing public expectations. Furthermore, health reforms addressed the issue of access to healthcare services for some groups, such as Aboriginal people and populations living in rural and remote parts of the country (Romanow, 2002).

Major challenges include the scarcity and isolation of healthcare professionals in many communities because of Alberta's large landmass; varied, extreme, and unpredictable climate; and population dispersion. Such realities were recognized as principal factors motivating the consideration of a provincial health information network. Alberta began to plan such a network in the mid-1990s, with the objectives of exploiting health information technologies and linking physicians, allied health professionals, hospitals, clinics, health organizations, and Alberta Health and Wellness (the provincial government's department of health) (Government of Alberta, 2003; Jennett, Kulas, Mok, & Watanabe, 1998). This network, entitled Alberta Wellnet, was a joint initiative by Alberta Health and Wellness and stakeholders in the health system. Initially, a core set of priority initiatives consisted of a pharmacy information network, telehealth, a healthcare provider office system, continuing and community care services, service event extract, population health and surveillance, and diagnostic services information sharing. This article describes the development of the provincial telehealth network in Alberta.

## THE PROVINCIAL DEVELOPMENT OF THE TELEHEALTH NETWORK

Just prior to the establishment of Alberta Wellnet, an anonymous philanthropic foundation expressed interest in exploring the feasibility of developing an integrated, province-wide telehealth network based on need, capability and support. One of the authors (ES) initiated discussions with the foundation through an intermediary, and a small team of content experts was assembled to begin dialogue. The foundation requested a letter of intent and a presentation of concept to substantiate the benefits of allocating funds to telehealth. Following internal review and external consultation, the foundation allocated $525,000 for the preparation of a telehealth business plan. A project planning team was formed to serve as the province-wide planning group and to oversee the preparation of the business plan. This team incorporated representatives from the RHAs, the health sector, the universities, and the community. Two province-wide focus groups were held with representatives from the stakeholder groups to discuss content and approach, and a number of meetings were held between the CEOs (chief

*Table 1. Donor foundation conditions*

- Funds to be used for capital purposes only
- 2 to 1 matching funds required ($7,000,000)
- Province-wide network (a minimum of 75% of the population, at least 12 Health Regions)
- Improve access (remove distance, especially for remote, isolated rural)
- Incorporation of all current pilot projects
- Sustainable, integrated into the Health Information System

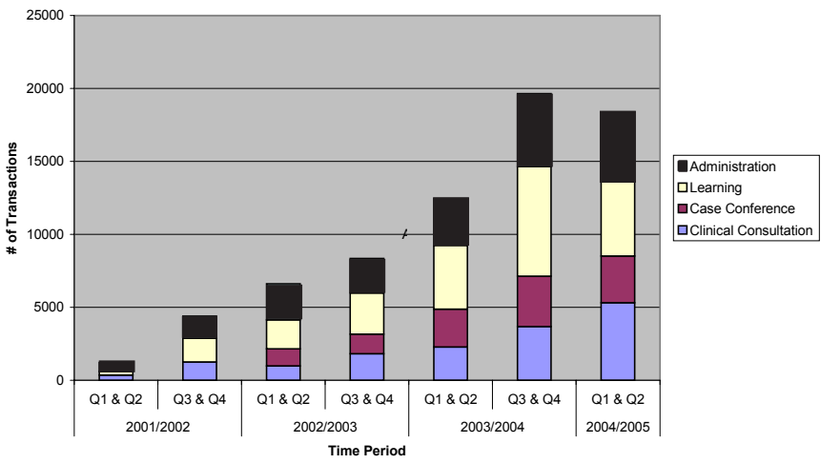
*Table 2. Milestones*

| | |
|---|---|
| 1994 | Health reform and restructuring in Alberta established 17 Regional Health Authorities (RHAs), down from >200. |
| 1995 | An anonymous philanthropic donor foundation expressed interest in exploring the feasibility of developing an integrated province-wide telehealth network based on need, feasibility, and support. |
| 1996 | Initial Business Plan supported the concept of a provincial telehealth plan. Potential allocation of $14 million, provided that a number of conditions could be met. |
| 1996 | Initial plans for a provincial health information network (Alberta Wellnet) began. |
| 1997 | Telehealth Coordination (ATCC) and Implementation Planning Committees (ATIPT) formed with action plans regarding policy, infrastructure implementation, and operational solutions. Vision and overall management report produced by the Telehealth Working Committee, with input from all stakeholders. |
| 1997 | $7 million one-time commitment, plus $1 million operating costs commitment from Alberta Health. |
| 1997 | Provincial Health Authorities' Association reestablished a charitable foundation to receive and to administer funds. |
| 1997-1998 | The Alberta Medical Association's Committee on Fees and Alberta Health opened the way to potential payment for telehealth services. |
| 1997-1998 | Telehealth handbook compiled to provide guidelines for regions initiating telehealth activities. ATIPT merged with ATCC. |
| 1998 | Joint Planning Committee held with Alberta Telehealth Coordinating Committee (ATCC), the RHAs, and the Provincial Boards resulting in four priority telehealth applications: psychiatry, emergency care, radiology, and continuing education. Frameworks for three issues were discussed: (1) needs assessment models, (2) funding models, and (3) provincial telehealth infrastructure and network. |
| 1998 | Decision Document produced for the Minister of Health, the RHAs, the anonymous philanthropic foundation, and the Alberta Medical Association. Business models for the four priority areas evolved, along with working groups assigned to each. |
| 1999-2000 | Establishment of Provincial Telehealth Committee and coordinator. |
| 1999-2004 | Central support services were initiated and deployed, including an interoperability standard testing framework for vendors, a scheduling system, followed by bridging and gatewaying services, core evaluation and costing frameworks, processes, and tools. |
| 2003 | Alberta's RHAs reduced from 17 to 9 health regions. |
| 2003 | Thirty clinical disciplines included in Telehealth. |
| 2003-2006 | Provincial Telehealth Strategic Business Plan approved. Five critical success factors were articulated. A number of proposed initiatives were put into place. |
| 2003-2006 | Telehealth Clinical Grant Fund established. Two calls for proposals have occurred, resulting in the funding of approximately 20 clinical projects and anticipated approval for an additional 20 projects. |
| 2004 | 10,000th telehealth clinical consultation occurred. |
| 2004 | Clinical telehealth service extended to First Nations Communities. |
| 2004 | Telehealth scheduling system extended to the Territory of Nunavut. |
| 2004 | First provincial clinical telehealth forum held. Second one approved for 2005. |

executive officers), their RHAs, and boards. The 17 regions and the two provincial boards at that time indicated their support in principle for a provincial telehealth network. The foundation's acceptance of the Provincial Telehealth Business Plan provided a commitment of up to $14 million to fund a provincial telehealth network pursuant to the satisfaction of a number of conditions (Table 1). The milestones associated with the development of the network are outlined in Table 2.

Specifically, the provincial telehealth network began its rollout in 1999 and continues to evolve and develop. A Provincial Telehealth Committee (PTC) comprised of health region, physician, and Alberta Health and Wellness representatives was formed in 1999 to provide strategic direction to this provincial initiative. Figure 1 outlines the current status of the network. In October 2004, there were 261 active telehealth systems that were networked and centrally connected through a network consisting of

*Figure 2. Growth of Telehealth—Increased administrative, learning, case conference, and clinical consultation transactions*




a combination of ISDN, SW56, and AGNPac. Applications were clinical, educational, and administrative in nature, and sessions were charted between 2002 and 2004 (Figure 2). In 2004, the network's 10,000th clinical consultation occurred, and clinical services were extended to the First Nations' communities.

Since 2001, central supporting services have been established to support all stakeholders. For example, an Internet-based telehealth scheduling system initially was deployed in 2001 to facilitate coordination of telehealth activities throughout the province and has been used successfully to support approximately 30,000 telehealth events. The system now is being shared with several other jurisdictions (Nunavut, Saskatchewan, some mental health sites in British Columbia, Alberta First Nation's and Inuit Health Branch sites). Other core services included an interoperability standards testing site for vendors at Alberta Research Council, bridging and gatewaying services as well as costing models and core evaluation frameworks. For example, a home telehealth business case template was completed to facilitate health region analysis of this mode of service, while a newly developed site-based costing model provided support for further research and the development of a sustainable economic model for telehealth in Alberta. Further, a comprehensive provincial evaluation process is in development. To this end, an Inventory of Telehealth Evaluation Activities in Alberta was completed in order to establish a baseline and to inform refinements to the existing evaluation framework. Associated indicator standards are being aligned with the Alberta Health and Wellness Quality Framework. The Health Information Standards Committee of Alberta recently approved a new Alberta telehealth videoconferencing standard, as technological standards are continuously evolving.

A Provincial Telehealth Strategic Business Plan (2003-2006), developed by the PTC on behalf of health regions and approved by the Council of CEOs, articulates five critical success factors to realize the full potential of the Alberta Telehealth network. These five foci include (1) providing timely access to quality care, (2) collaborating effectively, (3) securing and effectively managing resources, (4) creating a culture that fosters change, and (5) formalizing the evaluation process and enhancing telehealth research.

At present, all of Alberta's Health Regions have telehealth programs in place. Due to required health system and provider buy-in rate, the clinical applications were slightly slower to evolve. As a consequence, a project that established incentives for the development of clinical telehealth applications was initiated. Alberta Health and Wellness funded a Telehealth Clinical Grant Fund (overseen by the PTC) resulting in more than 20 clinical telehealth projects, including cardiology, emergency, diabetes, urgent mental health, and pediatric services. A recent call for proposals is expected to result in funding of 20 additional projects, some of which will be extended to First Nations Communities.

## SIGNIFICANT LESSONS LEARNED AND OBSERVATIONS

There were many lessons learned during the development of the Provincial Telehealth Program. They fall into two broad categories: (1) Business, Funding, and Sustainability

(four items) and (2) Policy, Operational, and Infrastructure Issues (15 items) (Table 3). A number of key observations also emerged. These included the need to:

- Understand the nature and the implications of health reform and restructuring;
- Identify and clarify policy and operational issues around specific applications;
- Incorporate adequate telecommunications infrastructure;
- Respect diversity in priorities as well as preparedness and state of readiness among Health Regions;
- Ensure provision for sustainable operational support; support preparation of business models for shared telehealth needs in the Health Regions;
- Pay special ongoing attention to human factors, including the reengineering and business change management work place processes; and
- Involve end users, including physicians, nurses, and administrators, early in the planning process and conceptual design.

## FUTURE TRENDS AND DIRECTIONS

Today, a major focus for the province is integrating the provincial telehealth program with other provincial health information initiatives. These include the Electronic Health Record Initiative, the Physician Office Support Program (POSP), and the Pharmacy Information Network (PIN). A second focus is on migrating from the current platforms to a high-speed, high-capacity IP broadband backbone (i.e., the SuperNet project) (Government of Alberta, 2002). In parallel, the province is continuously examining new evolving technologies and partnerships that can optimize the use of ICTs within the health sector, with a focus on quality of care, patient safety, and evidence-based decision making at the point of care.

*Table 3. Lessons learned*

**Business, Funding, Sustainability**

- The preparation of business models for shared telehealth needs in the health regions was helpful to ensure buy-in and progress.
- There is a great deal of work remaining after program initiation.
- Funding opportunities to cover the initial and ongoing operating costs of Telehealth require ongoing vigilance.
- Accountability for all network components required articulation.

**Policy, Operational and Infrastructure Issues**

- Raising awareness of Telehealth and its potential continues to be challenging, as Telehealth encompasses a variety of areas and technical complexity, which is difficult to reduce to simple language.
- A number of policy and operational issues around specific applications were identified and required further study and clarification.
- Cross-jurisdictional policy work is extremely time-consuming. For example, the number of editions of the consent policy framework was extremely high.
- Respect for diversity of state of readiness, priorities, and partners/collaborators among regions was required.
- A representative governance structure was required. All stakeholders needed to participate in the planning and decision making during the early stages of rollout.
- A decision document for the Minister of Health, the Health Authority, the anonymous philanthropic foundation, and the Alberta Medical Association was a tool to enhance successful integration and buy-in.
- A clear understanding of the nature and implications of health reform and restructuring are required before telehealth can be integrated into a regional health system. Telehealth must align with and support major health reform initiatives in order to continue to be supported by and to be successful in the provincial funding structure. It also must take into consideration the convergence of technologies as it evolves.
- Alberta Health, the Ministry of Health, was a key player in initial successful implementation.
- Consideration of the province's overall health information approach was important. Multiple reporting requirements are needed.
- In early stages, policy and integration committees were helpful to move agendas along. Commitment was central as expertise, time, and expenses were volunteered.
- Continual revisiting of critical issues with RHAs and Provincial Boards, along with ongoing active participation, was required. Perseverance in planning and development is rewarded.
- Adequate infrastructure (telecommunications, trained staff, etc.) for a network was critical.
- Identification of pressure points, along with provincial barriers and obstacles, was difficult but essential in order to move the agenda along.
- Implementation requires close attention to human, system, and workplace factors.
- Ongoing evaluation and monitoring is required for continuous quality improvement.

## CONCLUSION

The deployment of the provincial telehealth network continues to grow and to strengthen. Many milestones were encountered in the development of the Alberta Telehealth Network (Table 2). Several significant lessons learned also were documented (Table 3). While significant progress has been made, challenges and impediments remain for the creation of a functional, sustainable, and integrated province-wide telehealth network. Specifically, the successful integration of telehealth into a broad provincial health information and health system demands attention to human, system, and workplace factors. The significance of several critical factors cannot be ignored: different degrees of regional and sectoral readiness to adopt telehealth as well as diversity in selected telehealth priorities, potential cultural shift in the way providers work and learn, training needs, and required public/private/academic sector collaborations.

It also was observed that telehealth and e-health initiatives make substantial impacts in key areas of health reform. Integration requires close attention to the ongoing healthcare restructuring movements as well as to the convergence of technologies. There is a tendency to simply add technology to existing processes; however, some of these processes need to be reengineered in order to realize the full potential of telehealth. Further, changing funding processes to better accommodate telehealth is extremely difficult; the amount and quality of evaluation research on the impact of investments in telehealth must be increased to support the decision makers.

The provincial telehealth network initiative provides ongoing progress reports as health reform and restructuring continue and as integration with other provincial health information initiatives continues.

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## KEY TERMS

**AGNPac:** AGNPac is a government of Alberta IP network.

**Bandwidth:** The range of frequencies transmittable through a transmission channel. If the channel is unique, the band is called baseband. If the channel is made multiple through a process of multiplexing, the band becomes wideband and can support data, voice, and video at the same time. (1) The difference between the highest and the lowest frequencies in a data communication channel. (2) The capacity of a channel. (3) A measure of the amount of information and, hence, its transfer speed, which can be carried by a signal. In the digital domain, bandwidth refers to the data rate of the system (e.g., 45 Mbit/sec) (Beolchi, 2003). Bandwidth is a practical limit to the size, cost, and capacity of a telehealth service.

**Broadband:** A popular way to move large amounts of voice, data, and video. Broadband technology lets different networks coexist on a single piece of heavy-duty wiring. It isolates signal as a radio does; each one vibrates at a different frequency as it moves down the line. Its opposite is baseband, which separates signals by sending them at timed intervals (Beolchi, 2003). Future networks, like those being deployed in Alberta, will carry these higher speed communications (i.e., Broadband ISDN).

**E-Health:** An emerging field in the intersection of medical informatics, public health, and business, which refers to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development but also a state of mind, a way of

thinking, an attitude, and a commitment for networked, global thinking to improve healthcare locally, regionally, and worldwide by using information and communication technology (Eysenbach, 2001). The Commission of the European Communities (2004) declares that e-health tools or solutions include products, systems, and services that go beyond simply Internet-based applications and include tools for both health authorities and professionals as well as personalized health systems for patients and citizens.

**IP:** Internet Protocol is the network layer protocol for the Internet (Beolchi, 2003).

**ISDN:** Integrated Services Digital Network is a set of international digital telephone switching standards that can be used to transmit voice, data, and video. It offers the advantages of error-free connections, fast call setup times, predictable performance, and faster data transmission than possible when using modems over traditional analogue telephone networks. Basic ISDN services combine voice and data, while broadband services add video and higher-speed data transmission. ISDN offers end-to-end digital connectivity (Beolchi, 2003).

**SW56:** Switch56 is digital telecommunication that transmits narrow-bandwidth digital data, voice, and video signals.

**Telehealth:** Encompasses the use of advanced telecommunications technologies to exchange health information and to provide healthcare services across geographic, time, social, and cultural barriers (Reid, 1996). Telehealth refers to all healthcare or social services, preventative or curative, delivered at a distance via a telecommunication, including audiovisual exchanges for information, education and research purposes, as well as the process and exchange of clinical and administrative data (Quebec Ministry of Health and Social Services, 2001). Homemade systems or systems used outside of official health information networks are included in the latter definition.

# African Regional Case of E-Government

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## INTRODUCTION

New developments in information and communication technologies (ICTs) over the past few decades, especially the establishment of the World Wide Web in the early 1990s, have created an unprecedented capacity for people to access and retrieve information on the Internet. Such developments have also affected the way public institutions, particularly governments, provide services to their citizens in addressing the challenges of improving government efficiency, effectiveness, transparency and accountability (Allen, Juillet, Pacquet, & Roy, 2001; Allen, Juillet, Miles, Paquet, Roy, & Wilkins, 2004; Holliday, 2002; La Porte, Demchak, de Jong, 2002; UN, 2004). In addressing these challenges, applications of ICTs have been considered as one of key components in the various public sector reforms, and to some extent associated with the coining of "reinventing government" (Heeks, 2001; Ho, 2002). Thus, by the late 1990s many governments were already delivering Web-based services as "an integral and significant part of a new 'e-government' " (Ho, 2002, p. 434).

All over the world, therefore, countries and states are at the various stages of implementing e-government or digital government to improve delivery of government services to their citizens and at the same time to provide increased avenues for direct participation of citizens in addressing with their governments the citizens' development needs. In general, in all respects of implementing e-government strategies, developed countries are far ahead of developing countries (Basu, 2004; La Porte et al., 2002; Nath, 2003; Netchaeva, 2002; Singh & Naidoo, 2005; UN, 2001, 2002, 2004) due to a number of reasons that will be highlighted later in this chapter.

## E-GOVERNMENT IMPLEMENTATION IN AFRICA

Many African countries are also e-government players at different levels of e-government development (Heeks, 2002; Kaaya, 2004; Mutula, 2002; Panagopoulos, 2004; Singh & Naidoo, 2005; UN, 2004). They have presumably been driven by current social, economic, political, and technological conditions—including public sector reform programs that were tied to structural adjustment programs—to adopt the strategies (Benjamin, 2001; Cain, 2001; Heeks, 2002). Or else, these countries were motivated by benefits that other already-implementing countries have reported, such as greater and more direct interactions with their citizens and business community (Allen et al., 2001; Silcock, 2001; Stowers, 2004; UN, 2001, 2004), enhancement of civil democratic participation (Garson, 2004; Netchaeva, 2002; Panagopoulos, 2004; Silcock, 2001), possible savings in terms of service running costs and time due to speedy processes (Garson, 2004; Heeks, 2002; Whitson & Davis, 2001), improved government accountability (Alan et al., 2004; Cook, La Vigne, Pagano, Dawes, & Pardo, 2002; La Porte, et al., 2002), and the promise of more access (Garson, 2004).

Conversely, these motivating factors might not be sufficiently attractive to some African circles, as they wouldn't like to see changes to the status quo. Moreover, Heeks (2002) argues that the issue of cost savings might not hold water in Africa because salaries of the civil servants in that region are so low that it might be more costly to invest in ICTs than maintaining cheap personnel to perform various government tasks. This is contrary to the situation of developed countries where replacing costly government staff with relatively cheap ICTs might seem more attractive. But levels of African e-government participation in terms of Web content and access are closely associated with the use of the Internet and related infrastructure (For statistics about telecommunication infrastructure in Africa—including telephone lines , ISPs, bandwidth capacities, and so forth—see the UNDP's World Development Reports at http://hdr.undp.org/ and Jensen's Report at http://www3.sn.apc.org/africa/afstat.htm). Therefore, it is important to get the general picture of Internet usage in Africa before dwelling on the situation of e-government services.

According to the latest estimates from the Internet World Stats (2004), there are 12,937,100 Internet users in Africa. These figures represent only 1.4% of the continent's population, indicating low penetration level. The number of users in Africa represents 1.6% of the world's users even though the continent's population represents 14% of the world's population. However, Internet use growth between years 2000 and 2004 was 186.6% compared to the world's use growth of 125.2%;

*Table 1. Number of Internet users in Africa in comparison with other world's regions (Internet World Stats, 2004)*

| Region | Population (2004 est.) | % of World Population | Internet Users (2004) | % Use Growth (2000-2004) | Penetration (% Population) | % Users in the World |
|---|---|---|---|---|---|---|
| Africa | 893,197,200 | 14.0 | 12,937,100 | 186.6 | 1.4 | 1.6 |
| Asia | 3,607,499,800 | 56.5 | 257,898,314 | 125..6 | 7.1 | 31.7 |
| Europe | 730,894,078 | 11.4 | 230,886,424 | 124.0 | 31.6 | 28.4 |
| Latin America and Caribbean | 541,775,800 | 8.5 | 55,930,974 | 209.5 | 10.3 | 6.9 |
| Middle East | 258,993,600 | 4.1 | 17,325,900 | 227.8 | 6,7 | 2.1 |
| North America | 325,246,100 | 5.1 | 222,165,659 | 105.5 | 68.3 | 27.3 |
| Oceania | 32,540,909 | 0.5 | 15,787,221 | 107.2 | 48.5 | 1.9 |
| World | 6,390,147,487 | 100.0 | 812,931,592 | 125.2 | 12.7 | 100.0 |

*Table 2. Top ten countries in Africa in terms of number of Internet users (Internet World Stats, 2004)*

| Country | Population (04 est.) | Internet Users 2000 | Internet Users 2004 | % Use Growth (2000-2004) | Penetration (% Population) | (%) Users in Africa |
|---|---|---|---|---|---|---|
| South Africa | 47,556,900 | 2,400,000 | 3,523,000 | 46.8 | 7.4 | 27.2 |
| Egypt | 68,648,500 | 450,000 | 2,700,000 | 500.0 | 3.9 | 20.9 |
| Morocco | 30,552,000 | 100,000 | 800,000 | 700.0 | 2.6 | 6.2 |
| Nigeria | 154,491,100 | 200,000 | 750,000 | 275.0 | 0.5 | 5.8 |
| Tunisia | 10,001,400 | 100,000 | 630,000 | 530.0 | 6.3 | 4.9 |
| Zimbabwe | 14,712,000 | 50,000 | 500,000 | 900.0 | 3.4 | 3.9 |
| Algeria | 32,080,000 | 50,000 | 500,000 | 900.0 | 1.6 | 3.9 |
| Kenya | 33,520,700 | 200,000 | 400,000 | 100.0 | 1.2 | 3.1 |
| Tanzania | 36,581,300 | 115,000 | 250,000 | 117.4 | 0.7 | 1.9 |
| Cote d'Ivoire | 18,946,700 | 40,000 | 240,000 | 500.0 | 1.3 | 1.9 |

this shows that Africa is far from reaching the critical point of Internet penetration. Table 1 compares these figures with those of other world regions.

From the data, Africa is far behind all other regions whether in terms of total number of users or Internet penetration, or even the continent's contribution to the number of users in the world. The world's average Internet penetration is nine times that of Africa. Within the continent itself, South Africa has the largest number of Internet users, but its penetration of 7.4% is far below the world's average of 12.7%. Table 2 shows top ten African countries in terms of Internet usage (including North African Arabic countries).

Internet penetration figures (Table 3) provide a clearer picture of the situation, since the order of countries by total numbers of users (Table 2) tends to favor countries with relatively high population. A good example is Nigeria with 750,000 Internet users but its Internet penetration is only 0.5%, which is about one-third of Africa's average. Seychelles, which does not feature among top ten countries in terms of the Internet usage numbers, has the highest penetration in the continent (14.1% of the population has access to the Internet). Thus, if the countries are rearranged according to their levels of Internet penetration instead of the total number of users, then the top-ten list is altered as shown in Table 3 (excludes colonies). Only Seychelles is above the world's average by 1.4 percentage points.

These figures, which The Internet World Stats obtained from a variety of sources, provide the general picture of Internet usage in Africa. It is hard to obtain precise figures in Africa due to the nature of usage in

*Table 3. Top 10 Internet users in Africa in terms of penetration (% of population with access) (Internet World Stats, 2004)*

| Country | Population (04 est.) | Internet Users 2000 | Internet Users 2004 | % Use Growth (2000-04) | Penetration (% Population) | (%) Users in Africa |
|---|---|---|---|---|---|---|
| Seychelles | 81,600 | 6,000 | 11,700 | 95.0 | 14.1 | 0.1 |
| Mauritania | 1,265,000 | 87,000 | 150,000 | 72.4 | 11.9 | 1.2 |
| Sao Tome and Principe | 139,000 | 6,500 | 15,000 | 130.8 | 10.8 | 0.1 |
| South Africa | 47,556,900 | 2,400,000 | 3,523,000 | 46.8 | 7.4 | 27.2 |
| Tunisia | 10,001,400 | 100,000 | 630,000 | 530.0 | 6.3 | 4.9 |
| Cape Verde | 463,600 | 8,000 | 20,400 | 155.0 | 4.4 | 0.2 |
| Egypt | 68,648,500 | 450,000 | 2,700,000 | 500.0 | 3.9 | 20.9 |
| Zimbabwe | 14,712,000 | 50,000 | 500,000 | 900.0 | 3.4 | 3.9 |
| Morocco | 30,552,000 | 100,000 | 800,000 | 700.0 | 2.6 | 6.2 |
| Algeria | 32,080,000 | 50,000 | 500,000 | 900.0 | 1.6 | 3.9 |

which individual ownership of the Internet accounts is minimal and many users share single access points—especially public and institutional networks (Heeks, 2002; Jensen, 2002). Jensen underlines this point:

*Because of the large number of shared accounts, and the high use of public access services, it is difficult to measure the total numbers of Internet users. While the number of dialup subscriber accounts is readily available, these figures are only a partial indicator of the size of the Internet sector and should be looked at along with other factors such as the quantity of international traffic each country generates and the extent of the local Internet infrastructure…large scale sharing of information resources is a dominant feature of the African media landscape* ... (http://www3.sn.apc.org/africa/afstat.htm)

Despite the dismal situation of the Internet, usage in Africa there is an overall increase in the presence of Africa's Web content although the continent's share of such content is still low, reflecting trends of Internet usage caused by a multiplicity of factors (Heeks, 2001, 2002; Jensen, 2002; Mutula, 2002; Sy, 1999). Still, most of the countries have official government Web sites (UN, 2004) in addition to several other Web sites created by different government agencies, but most of them are in their early stages of development.

In his discussion of the status of African Web content, Mutula (2002) underlines the importance of the quality of information posted on the Web and such quality can be assessed using such measures as interactivity with the users, currency, accurate and rich downloadable materials, and community-oriented content. The measures can be used to determine the status (development stage and quality) of government Web sites by matching the results with existing models. One of the models, developed by the United Nations, Department of Economic and Social Affairs (DESA), Division for Public Administration and Development Management, describes five stages of e-government development (UN, 2002, 2004) as (1) emerging presence, (2) enhanced presence, (3) interactive presence, (4) transactional presence, and (5) seamless or fully integrated/networked presence (see the article on development stages of e-government for details). In 2002, 20 African countries were in the first stage, 16 in the second stage, four (Egypt, Mauritius, Morocco, and South Africa) in the third stage, while no African country had its e-government services matured enough to go beyond the third stage. The 2004 report shows that Mauritius has reached the fourth stage, as the country now provides many online services and transactions including tax filing (UN, 2004).

The UN-DESA has also benchmarked the member states of the UN using the status of their Web sites, telecommunication infrastructure and human resources to develop the e-government index (UN, 2002) or e-government readiness index (UN, 2004). The report on the e-government readiness index was accompanied by the results of an assessment on e-participation that deals

*Table 4. Regional comparison of e-government readiness indices (UN, 2004)*

| Region | E-Government Readiness Index | Region | E-Government Readiness Index |
|---|---|---|---|
| North America | 0.875 | Western Asia (incl. Middle East) | 0.409 |
| Europe | 0.587 | South & Central Asia | 0.321 |
| South & Eastern Asia | 0.460 | Oceania | 0.301 |
| South & Central America | 0.456 | Africa | 0.253 |
| Caribbean | 0.411 | **Global Average** | **0.413** |

*Table 5. E-government readiness indices of the top ten African countries (UN, 2004)*

| Country | E-Government Readiness Index | Country | E-Government Readiness Index |
|---|---|---|---|
| Mauritius | 0.5055 | Cape Verde | 0.3442 |
| South Africa | 0.4902 | Uganda | 0.3290 |
| Seychelles | 0.4259 | Namibia | 0.3272 |
| Botswana | 0.3827 | Lesotho | 0.3250 |
| Swaziland | 0.3647 | Algeria | 0.3248 |
| **African Average** | **0.2528** | | |
| **Global Average** | **0.413** | | |

with involvement of citizens in decision-making processes via e-government activities. In these assessments, African countries are behind other countries; the situation is reflected in the average figures of the world regions on the e-government readiness index (Table 4). Table 5 shows the top ten African countries in terms of their e-government readiness indices.

The UN has also classified various regions and sub-regions according to progress of their government Web sites. Although the groupings of sub-regions of Africa is debatable (e.g., placing Zambia and Zimbabwe under eastern Africa, and Angola under "middle Africa" while these three countries are in the southern African region), the scores reflect the real regional disparity in e-government development: the African region had the lowest average score of 31.9, which is only 13% of the highest scoring region, North America (Table 6).

Furthermore, the UN has benchmarked its member nations in terms of percentage utilization of the five development stages of e-government, and classified the countries into three categories: High Range (average percentage utilization 67-100%); Mid Range (34-66%) and Low Range (0-33%). With the exception of Mauritius and South Africa, all of the African countries fall under the Low Range category. Globally, there are 16 countries in the High Range category, 48 in the Mid-Range, and 114 in the Low Range category. Mauritius utilizes the stages of e-government at 100% (stage 1), 73.6% (stage 2), 69.0% (stage 3), 17.1% (stage 4), and 7.4% (stage 5), with an average utilization of 51.1%. South Africa's utilization scores are 100% (stage 1), 80.5% (stage 2), 55.4% (stage 3), 0% (stage 4), and 16.7% (stage 5), with an average score of 48.7%. The United States leads the world in utilization: 100% (stage 1), 97.7% (stage 2), 94.0% (stage 3), 92.7% (stage 4), and 77.8% (stage 5), with an overall average of 92.0%. Forty-five out of 54 African countries have national official Web sites while, according to the UN, seven African countries—the Central African Republic, Equatorial Guinea, Eritrea, Guinea Bissau, Liberia, Libya, and Zambia do not have government Web sites.

Countries that have e-government have adopted the strategies as a result of a number of factors, both internal and external. The external factors have been associated with donor-funded projects that attempt to streamline government structures to improve its efficiency. There are mixed reports on the levels of success of specific implementation programs of individual countries (Benjamin, 2001; Cain, 2001; Heeks, 2002; Kenhango, 2003). Kenhango (2003) reports a project initiated by the Cameroonian Government through its tax department using a Web-based system to improve its tax system. The project aimed to provide the citizens and the business

*Table 6. Government Web site scores of Africa and its sub-regions in comparison with other regions of the world (Adapted from UN, 2004)*

| Region/Sub-Region | Representative Countries | Total Score | Average Score |
|---|---|---|---|
| Eastern Africa | Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, Uganda, Tanzania, Zambia, Zimbabwe | 534.0 | 31.4 |
| Middle Africa | Angola, Cameroon, Central African Republic, Chad, Congo, DRC, Equatorial Guinea, Gabon, Sao Tome and Principe | 163.0 | 18.1 |
| Northern Africa | Algeria, Egypt, Libya, Morocco, Sudan, Tunisia | 226.0 | 37.7 |
| Southern Africa | Botswana, Lesotho, Namibia, South Africa, Swaziland | 359.5 | 71.9 |
| Western Africa | Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo | 407.5 | 25.5 |
| Africa | 53 countries | 1690.0 | 31.9 |
| Asia | 47 countries | 3513.0 | 74.7 |
| Caribbean | 13 countries | 598.0 | 46.0 |
| Central America | 8 countries | 757.5 | 94.7 |
| North America | 2 countries | 485.0 | 242.5 |
| South America | 12 countries | 1350.5 | 112.5 |
| Europe | 42 countries | 5487.0 | 130.6 |
| Oceania | 14 countries | 728.0 | 52.0 |

community with the information on tax regulations; reduce the cost and improve the precision of tax collection processes; enhance transparency, hence reducing corruption; and initiate dialogues between the tax department and its stakeholders, notably, citizens, businesses, and scholars. The first step in that project was the establishment of a Web site in November 2001 with all the information needed to facilitate tax related activities for both parties. Kenhango notes that the project registered some progress in educating taxpayers about various tax procedures and that after some six months the Web site had received 3,500 hits and 150 downloaded documents. However, its impact was not felt much because of low internet penetration in that country (less than 3%), lack of skills, lack of online interactivity with the taxpayers, and resistance from some of the tax department's staff.

Benjamin (2001) reports several projects in South Africa that endeavored to use information technology to enhance community development and democratization as part of wider public reform strategies that also aimed to improve efficiency and accountability. Throughout that country, multipurpose community centers (equivalent to telecenters) have evolved as important access points for information, including government information in electronic form, by the general public. The projects had varying degrees of successes and failures, though I think it would appear too early for the ICT-government-based strategies to have matured enough for concrete evaluation of their impact (Gupta & Jana, 2003) have also observed this in India). Failures occurred when the services offered did not address community needs and when they lacked sustainability strategies. There are other projects that can be considered as types of e-government strategies in Africa, such as those reported by Cain (2001) in Ghana, Uganda, and Zimbabwe, Heeks (2002) in several countries, and ongoing telecenter development along with community-based initiatives in promoting ICTs for good governance in Tanzania, but the experiences reported are more or less similar because most African countries share similar problems and challenges (These projects are under the coordination of the Commission for Science and Technology of Tanzania; see http://

www.costech.or.tz for details). Problems, challenges, and possible strategies for solutions will be discussed in the next section.

## CHALLENGES FACING AFRICAN COUNTRIES

To realize potential benefits associated with the implementation of e-government strategies, African countries need to address many challenges associated with prevailing conditions in the continent. Some of the problems have been previously highlighted in the brief descriptions of e-government case projects. Although many of the African problems are related to poor economic conditions, one can also argue that problems of access are related to poor priority setting when it comes to investment plans. One of the fundamental requirements for successful implementation of e-government and related services is to ensure that essential infrastructure is in place, including reliable telecommunications services and power supply for connectivity, as well as necessary hardware and software for implementation. Those must go hand in hand with human resources that are sufficiently skilled to collect, organize, disseminate and preserve government information, and, above all, to maintain a system that should also have sufficient archival and security infrastructure (Abie et al., 2004; Adam, 1996; Jaeger & Thompson, 2003; Jensen, 2002; Probir & Chau, 2004; UN 2001, 2004; Yee et al., 2005). Fulfillment of these requirements, along with users' education, will improve delivery of, and citizen's access to government information.

As clearly signified by the Internet usage statistics at the beginning of this article, as well as the stages of e-government and the only partial successes of the case studies, access barriers are more pronounced in Africa than in other developing countries (Adam, 1996; Akst & Jensen, 2001; Basu, 2004; Jensen, 2002; UN, 2001, 2002, 2004). Mutula (2002) discusses the contribution of Africa to global Internet content and cites such problems as poor telephone and power supplies; disparity in infrastructure development between urban and rural areas; English dominated Web content which is only understood by a minority elite (the UN's 2004 survey shows that 60% of government Web sites are in English); low literacy levels; and uncoordinated e-government activities, as key problems facing Africa. Similar problems have been noted by Kenhango (2003) in the case of Cameroon described above, as well as Cain (2001), Benjamin (2001), Heeks (2002), and Jensen (2002). If not addressed forcefully they will exacerbate the digital divide problem both nationally and internationally.

Thus, any successful implementation of e-government services should go hand in hand with strategies to narrow the digital divide, which entail addressing the many challenges and problems mentioned in this section.

Poor infrastructure and associated high tariffs have also resulted in high access charges in Africa. For instance, Jensen (2002) notes that, in Africa, the average charge of a local dial up Internet service for 20hr/month is about $60, compared to $22 in USA and $33 in Germany, where per capita income is more than ten times that of African. Many people resort to public access points since they can not afford equipment and connection charges.

Committed leadership and political will are important because they reflect government's willingness to commit enough resources in support of e-government services for their sustainability, let alone the creation of suitable environments for infrastructure development. In this connection, some leaders might resist the adoption and implementation of e-government strategies in fear of changes in existing government structures (Allen et al., 2001).

Addressing the above challenges is just a step toward full-fledged e-government strategies since there are other factors that influence the use of Web-based and other services. These include user-friendliness; currency, accuracy, and reliability of information provided; availability of back information; privacy of user-submitted data and data on individual citizens; and general interactivity of such services as Web-based transaction facilities and prompt responses from government officials in answering users' queries (Gilliland, personal communication; Holliday, 2002; Kaaya, 2004; Silcock, 2001).

## LOOKING FORWARD AND CONCLUSION

This author often cites Silcock's (2001) remark that, "One of the fundamental differences between e-government and e-business is that whereas business can, by and large, choose their customers, government cannot. For e-government to succeed fully, the dream of Internet access for all has to become a reality" (p. 94). Indeed, African countries need to work harder than ever before to realize that dream and the promise of digital government (as outlined by Garson, 2004). There are various initiatives taking place in individual countries as well as among regional and international groupings to address problems of access. For instance, the UN's Economic Commission for Africa, through the African Information Society Initiative (AISI) and other related initiatives is encouraging African countries to develop and implement national plans for information and communication infrastructure. Nearly half of African nations have developed such plans

and the ministerial statement of the 34th session of the Commission states, "Information and communications technologies hold the promise of enormous positive influence on our countries' economic and social development" (See http://www.uneca.org/aisi/nici/country_profiles/default.htm, accessed on October 17, 2005.) Additionally, Jensen (2002) observes that the African Union in collaboration with the international community under the program, New Partnership for African Development, is addressing many issues in order to speed up development. Observers hope that the program will accelerate adoption of ICT-related strategies and thus improve access to information. Jensen reports that key issues being addressed include erratic (or non-existent) power supply; tax regimes that render such devices as computers, telephone connections, cell phones, and other ICT-related equipment, peripherals and services unaffordable by average citizens; brain drain, low education and literacy levels, and lack of skills; and an unfriendly business environment for increased investment in the ICT sector caused by poor policies and institutional structures.

Several other initiatives related to training on Internet applications. These are offered by universities and private companies in Africa, or supported by various international organizations such as the UNDP and other UN agencies, USAID, IDRC, the World Bank, and various NGOs. There are also several intergovernmental regional and international agencies that have incorporated ICT-related initiatives in their strategic development plans to benefit member nations. These include the African Development Bank, COMESA, IGAD, the East African Community, the West African Economic Cooperation, and the Commonwealth Secretariat, to mention but a few.

One promising trend in Africa is increasing access to wireless telecommunication technology, which is opening up the potential for accessing the Internet and associated services via the mobile phones (Minges, 2004). In many countries of Africa, the density of cell phones outnumbers that of fixed telephone lines. The use of short message service or SMS on mobile phones is now popular in many African countries; this is a precursor to full Internet access via cellular technology. With the advances in the third generation (3G) of the cellular technology, the potential for more access to the Internet—including people's interaction and use of e-government services—is imminent, even from remote rural areas.

It is generally presumed that adoption and implementation of e-government strategies will continue to be a gradual or evolutionary process, and that levels of service provision will differ from country to country and from one government agency to another in the same country. Thus, the prevailing e-government services in Africa are unlikely to include the whole range of services that exist in developed countries. The gradual development of e-government services will be complementary to traditional provision of government services. This is because there are services that will continue to be more effectively provided through traditional means—especially in the printed paper media and face-to-face communication—which is a deeply-rooted culture that will take years to disappear, not only in Africa (no wonder many voters in the United States want the printed versions of electronic ballots).

Finally, along with the promise of e-government in Africa, it is also necessary to keep in mind the limitations of electronic media from the perspective of preservation and persistence of information, along with security and privacy issues. These issues pose challenge to all of the countries that have adopted e-government strategies worldwide and are a subject of debate among scholars in this subject (Collada, 1999; Gilliland, personal communication; Karim & Khalid, 2003). Such limitations require clear policies on the necessary infrastructure to address them. Of particular interest to researchers focusing on the emerging e-government services in developing countries including Africa, this researcher has raised1 the following important issues for discussion: (a) A shift from paper to electronic media and more government control—what will happen if the Web-based information disappears? Are there institutions that are providing parallel paper-based information? (b) What is the degree of political stability and will it affect e-government services? (c) Is there a safe harbor for information—free from hacking? What is the ability of the governments to deliver e-government services (e.g., in terms of equipment, power supply, skills, etc.)? (d) Are there standard methods of assessing the status of e-government services? (e) Are there reliable methods of determining the Internet usage in both the urban and remote areas (owing to the magnitude of use via public access points)?

Strategies to overcome the digital divide should initially focus on improving and expanding public access points, since individual ownership of the facilities for access is not feasible for the majority of the African population in the near future. Heeks (2002) goes further to suggest the need for intermediaries to assist in bridging the digital divide for many people who "are not direct owners nor direct users of ICTs." As noted in the preface of the *Global E-Government Readiness Report 2004: Towards Access for Opportunity* (UN 2004),

*The challenge for development today is to find ways and means to surmount the inequality in development benefits from new technologies.*
*The new paradigm of development requires a re-visitation of the way countries think about ICT and e-government. It needs innovative approaches to government and the*

*public sector; business and the citizen; and culture and society. A holistic approach is required which fully exploits the centrality of ICT for the vision of a future knowledge society.* (p. i)

Furthermore, the UN calls on governments to adopt "access for opportunity" as a policy goal, to direct efforts on knowledge societies, and to recognize the importance of ICTs for development by including them in their national plans.

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## KEY TERMS

**Adoption:** A decision to make full use of an innovation as the best course of action available (Rogers, 2003).

**Digital Divide:** The gap between those who can effectively use information and communication tools such as the Internet, and those who cannot (Digital Divide Network).

**E-Government Implementation Strategies:** All of the activities involved in executing e-government services such as hardware/software acquisition and installation, personnel and user training, creating government Web sites, e-government service delivery, and so on.

**Information and Communication Technologies (ICTs):** "The technology used to handle information and aid communication." (Hyperdictionary.com)

**Information Technology (IT):** "Applied computer systems—both hardware and software, and often including networking and telecommunications, usually in the con-

text of a business or other enterprise" (hyperdictionary.com)

**Internet Penetration:** The proportion of a population, usually expressed in percentage, that has access to the Internet.

**Multipurpose Community Centers (MCC):** Organizations offering a range of development services (including information services) to a specific community with a large degree of community involvement (Benjamin, 2001)

**Telecenter:** "A multifunctional office area outfitted with communication and information processing equipment using computer assets with access to telecommunication networks" (Telecentro)

**Teledensity:** The number of telephone lines per number of people.

## ENDNOTE

[1] Kaaya (2005). Examining the adoption, implementation and institutionalization of e-government strategies in East Africa. PhD Dissertation in preparation. University of California Los Angeles, Department of Information Studies.

# Alive and Interactive through Streaming Media

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## INTRODUCTION

The advent of new technologies in organizations has created unprecedented challenges for professionals and managers alike to explore several cost-effective technology solutions aimed at improving communications among their target audiences. One such technology, which is gaining popularity, is streaming media. Streaming media has been around for approximately 10 years, but only now is becoming the fastest growing IT sector, with real revenues and a bright future (Alanko, 2004).

Streaming media is a delivery technology that has great potential for enhancing the way people communicate and share information. The evolution of streaming media has made huge strides in the world of the Internet, from a medium which delivered unstable video streamed very slowly through inadequate networks, to one today that rivals the reach in some cases of small cable television channels and local market radio stations.

The use of streaming media is becoming a mainstream communications tool in the public sector. It has the ability to enhance communications both internally and externally (i.e., important announcements, bulletins, community outreach, online learning, training, etc.). Many government departments have started offering live and archived Webcasting of numerous government meetings and programs via the Internet. Whereas outreach has previously been strictly limited to certain individuals, information is now being made available to a wider audience through the use of streaming media.

## BACKGROUND

In general, the terms Webcast and streaming media are used interchangeably. Webcasting covers all the steps in producing an online broadcast from capture and encoding of content through to delivery. A Webcast is a presentation in which a live event is recorded and streamed over the Internet, or archived for viewing at a later time. Streaming media refers to the software that actually delivers the Webcast to the user's desktop media player over the Web. Streaming media was developed to compress and transfer video and/or audio data through a computer in such a way that the file could start to play while downloading (Improvement and Development Agency & Xpedita Limited, 2003). Similar to a live newscast, a live Webcast has the capability to dynamically communicate information and ideas in real time. Unlike media files that are downloaded as large units and saved to your hard drive where they take up disk space, streaming media is sent in a continuous "stream" and played piece by piece as it arrives.

Streaming media as a delivery method allows people across the country and around the world with Internet access to participate in an event. The vast majority of new model PCs come equipped with everything required to view a Webcast. Users require an Internet connection, a sound card and speakers, and a media player program which is downloadable from the Internet. A media player program enables viewers to see and hear streaming media content. These players stream prerecorded and live media over the Internet, and can play back media that has been saved to disk.

## HOW DOES STREAMING WORK?

Although streaming media may seem quite complex to those who are not technologically savvy, it is all really based on these four simple steps (Adobe Dynamic Media Group):

1. The end user selects a media file, causing a request to be sent to the Web server.
2. The Web server relays the request to the media server.
3. The media server streams the media file back to the end-user's computer.
4. The client, or "player," decodes and plays back the media file.

## WHO IS USING STREAMING MEDIA?

Demand for Webcasting has increased widely in the past 2 years from government departments to large private sector corporations wishing to reach shareholders and organizations over vast areas. With the development and growth of the Internet, media delivery has been revolutionised making distance and location irrelevant.

Government departments are faced with the considerable task of communicating important policy, program and security information to internal and external clients. As a result, many government departments have started to Webcast key presentations, speeches and conferences on their Internet and intranet sites. This is possible largely due to boosts in broadband connections across government departments, organizations, educational establishments and households, along with advances in digital compression and video production technology.

Indian and Northern Affairs Canada (INAC) implemented streaming media as an in-house service for departmental employees in early 2002. Prior to implementation the department profiled target audience members to determine application needs and quality requirements. The profile showed a strong growth potential for streaming media within the department.

INAC projects have been aimed at conveying messages to both internal and external audiences. Messages from senior management, national workshops and training sessions are a few of the internal Webcast projects that have been undertaken. Connecting Youth in Canada was a Webcast project targeted for external audiences, specifically high schools, educators and other government departments. It encompassed a series of four, 30 minute live Webcasts streamed from Aboriginal communities across Canada (some remote). The project was aimed at getting Aboriginal and non-Aboriginal youth talking about issues and concerns that matter to them. Viewers were able to interact and express their thoughts with students in real time via e-mail.

From a market that was nonexistent, huge strides have been taken to make streaming media a success within INAC. The latest advances in audio and video streaming technology have been utilized to deliver conferences, seminars, speeches, corporate meetings and other business presentations over INAC's departmental Intranet and corporate Internet sites.

In August 2004, an online survey was posted to the departmental Intranet Web site to help determine the perceptions and experiences that INAC employees have towards Webcasting. Survey responses show that Webcasting is a tool that most INAC staff believes would be of benefit to them and their sectors/branches. Furthermore, many responded that Webcasting is an inevitable technology, which they would like to learn more about.

## BENEFITS

Streaming media is gradually emerging as the cornerstone of effective enterprisewide communication and knowledge sharing. There are several benefits of streaming media, one of which is the use of the technology as an e-learning tool. Streaming media has great potential value for creating interactive and engaging presentations, training applications and business communications. Users have the ability to capture and synchronize audio, video, slides and imaging to create rich-media presentations, which can be made available to the desktops of live target audiences.

*Table 1. Benefits of streaming media*

- Easy to understand and use
- Integrated and interactive
- Conducive to cooperative work environment
- Flexible
- Supportive of a large audience
- Improved information experience
- Unmatched knowledge sharing
- Consistent messaging delivered to multiple audiences
- Decreased travel, communication, and training costs
- Increased productivity
- Improved customer service
- Stronger, more developed corporate culture
- Direct transmission of communications to the desktops of targeted audiences
- Quick (do not have to wait for complete download of video)
- Continuous feed without interruption
- Video is not saved to hard drive
- Video and/or audio can be delivered live and archived simultaneously
- Video and/or audio can be delivered live and translated simultaneously

People using this technology have the opportunity to promote their organization, department or product online. The media player is an excellent place to post graphic identifiers, Website links and contact information, resulting in increased awareness and recognition. Furthermore, Webcasts give viewers more opportunities to express themselves via e-mail. Viewers have the opportunity to e-mail questions, concerns and suggestions during live and on-demand events. Viewer participation bonds users to the event by giving them a sense of importance and membership. It also gives viewers the sense that they are right there in the studio. Televised events are generally cut down to fit the scheduled time window of the network. Webcasts can portray a live event in its entirety, unedited, so viewers feel like they have a front-row seat on the action (ClearStreaming, Inc. & NeuronBroadCasting.Com, 2001). Additionally, streaming media provides event organizers with the potential to capture a worldwide audience without the associated costs of conventional broadcasting. Streaming media is a very effective and affordable marketing tool (Rhodes). A number of other benefits are listed in Table 1.

Although there is no replacement for in-person interaction, streaming technology is rapidly emerging as the next best alternative.

## SOME RELUCTANCE STILL EXISTS

With the introduction of any new technology, reluctance to adopt it is frequently observed. Although Webcasting has been present in the IT sector for many years now, there is still a high percentage of potential consumers who are not aware that the technology exists. Potential customers do not know, nor do they always have time to find out, how to make Webcasting work, especially when they are not familiar with the technology. Therefore, many potential Webcasting consumers find it easier to have a teleconference or have an on-site seminar no matter how much more expensive it is (Alanko, 2004). Moreover, some people may feel intimidated by the technology. It is quite possible that potential users simply overestimate the complexity of streaming media.

Another reason people may be reluctant to use streaming media stems from the conception that it costs too much. Because streaming media is a relatively new tool in corporate communications, it is often misunderstood as a service that is too expensive, or only for larger companies. In many cases streaming media can be less expensive and more effective than its print, broadcast and telecommunications counterparts. It all depends on the scope and objectives of the communications strategy.

As streaming media continues to capture larger segments of public sector and corporate environments, awareness and acceptance of the technology will increase. The good thing is that the technology necessary for successful Webcasting already exists and is quite well developed (Alanko, 2004). Streaming media has evolved immensely since its introduction to the Internet. There have been vast improvements in both compression and quality that will have positive effects on consumers' experiences. The quality of standards-based streaming video now rivals, and sometimes surpasses, conventional broadcast television. The three principle technology standards for streaming—MPEG-1, MPEG-2, and MPEG-4—are all capable of delivering high-quality streaming media over virtually any network today (Mavrogeanes, 2004).

## FUTURE TRENDS

Webcasting will have an important part to play in the way institutions communicate with their audiences in the future. Already, the growth of Webcasting has been far greater than expected. As high-speed Internet becomes more prevalent and the quality of Web-based video improves, it is expected that Webcasting will become even more popular in the home and work environment. Research conducted by various companies indicates that more people are watching video online than ever before. Research has concluded that:

- By 2006, 80% of the top 2000 businesses worldwide are expected to deploy video applications to employees' desktops
- By 2006, video streaming at work will be worth $200 million
- By 2005, worldwide revenue for streaming media services will exceed $5 billion (Brainware TV, 2004)

## CONCLUSION

Today's computer systems are far more than computational and text processing tools. Internet streaming and broadband markets have seen tremendous growth since 1995, and they continue to grow. The Internet market grows by at least 85 million users per year, with about 5% to 10% of that number accessing broadband Internet at work, at school, or at home (Multimedia Research Group, 2001). As people become more comfortable with Internet Web technology, an increase in the demand for streaming media services will almost certainly be observed. Many government departments have already embraced the power of streaming media to deliver corporate communications and training directly to users' desktops. Streaming a wide variety of announcements via the Internet is quickly becoming the new standard for the dissemination of government related information.

Streaming media is no longer a minor player in the world of technology. Statictics show it is being used and consumed on a broad and ever-expanding scale (Tyler, 2005). Many corporations have considered introducing streaming media into their work settings for quite some time; however, it is something that must be implemented carefully in order to obtain acceptance from users. With a video camera, some imagination and the proper equipment, streaming media can deliver leading edge interactive communications within a global context, and, in fact, it is not even limited to this planet.

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## KEY TERMS



**Broadband:** This refers to any telecommunication including Internet access in which a wide band of frequencies are available to carry information. The large number of frequencies means that information can travel at faster speeds than narrowband access.

**Broadcast:** When data is sent to all work stations on a network at the same time.

**E-Learning:** The delivery of a learning, training or education program by electronic means. eLearning involves the use of a computer or electronic device in some way to provide training, educational or learning material. eLearning can involve a greater variety of equipment than online training or education, for as the name implies, "online" involves using the Internet or an intranet. CD-ROM and DVD can be used to provide learning materials.

**Encoder:** A software application or a device (hardware) used to encode – that is, compress and format digital video or audio.

**Encoding:** A technical term used to describe the compression of media files into specific formats (i.e., Real Media, Quicktime, Windows Media)

**Information Technology (IT):** The branch of technology devoted to (a) the study and application of data and the processing thereof; that is, the automatic acquisition, storage, manipulation (including transformation), management, movement, control, display, switching, interchange, transmission or reception of data, and (b) the development and use of the hardware, software, firmware, and procedures associated with this processing.

**Internet:** A worldwide system of computer networks in which any one computer can get information from/or talk to any other connected computer using the TCP/IP protocols.

**Intranet:** A private network inside a company or organization that uses the same kinds of software that you find on the public Internet, but which is only for internal use.

**Media:** A term with many different meanings, in the context of *streaming media*, it refers to video, animation, and audio. The term "media" may also refer to something used for storage or transmission, such as tapes, diskettes, CD-ROMs, DVDs, or networks such as the Internet.

**Media Player:** An application that enables users to play audio and video files on their PC.

**Media Server:** Specialized server software that takes advantage of appropriate Web transfer protocols such as RTSP (real time streaming protocol), as well as special communication techniques between clients and servers, to facilitate the continuous playback of synchronized audio and video in real time, adjusting the streams transmitted to the actual bandwidth available. Media server software may be running on discrete hardware, or can be deployed in combination with Web server software running on the same device.

**MPEG:** Motion Pictures Expert Group of the International Organization for Standardization (ISO) has defined multiple standards for compressing audio and video sequences. Setting it apart from JPEG which compresses individual frames, MPEG compression uses a technique where the differences in what has changed between one frame and its predecessor are calculated and encoded. MPEG is both a type of compression and a video format. "MPEG-1" was initially designed to deliver near-broadcast quality video through a standard speed CD-ROM. Playback of MPEG-1 video requires either a software decoder coupled with a high-end machine, or a hardware decoder. "MPEG-2" is the broadcast quality video found on DVD's. It requires a hardware decoder (e.g., a DVD-ROM player) for playback. "MPEG-4" is a relatively new standard, now being used in some architectures for streaming media.

**Network:** A network is a number of computers connected together to share information and hardware.

**Streaming Media:** A technology developed to compress and transfer video or audio data through a computer in such a way that the file can start and play while it is downloading.

**Teleconference:** Live, two-way audio transmission between two or more locations. Usually includes speaker phones and microphone amplification systems that allow audio volume balancing for people at different locations from the microphone.

**Video-on-Demand:** Describes video content which may be viewed by the end-user whenever they want, any time of the day or night. A prerecorded Webcast.

**Webcast:** A presentation in which a live event is recorded and streamed over the Internet, or archived for viewing at a later time.

# American E-Government Service Sectors and Applications



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## INTRODUCTION

Citizens routinely use technology to increase the efficiency of their transactions in every area of their lives. It is, therefore, logical that citizens expect technology to be used to improve the efficiency of their transactions with their government. In response, the United States government has developed electronic interfaces combined with the Internet called electronic government or e-government. E-government is the communication between the government and its citizens, businesses or itself by the use of computers and a Web-enabled presence.

## BACKGROUND

Government departments were once commonly held to be inefficient because they had little motivation to please the citizen, and the citizen did not have an alternative provider available for these services. E-government represents an opportunity to serve the interests of the government and the citizen because it allows one point of contact at a convenient time. In addition, it allows the government to process information more efficiently and collect data while doing so.

As the scope of government increases, so does the tax burden on the citizen. One of the greatest opportunities to reduce costs is by increasing the efficiency of services delivered. Given that 60% of all current Internet users interact with government Web sites, e-government represents a logical way to reduce transaction costs (E-Government Task Force, 2002). These savings can be realized with virtually no cost to train the citizen, as many citizens are already Internet proficient and have provided the equipment in their own home at no cost to the government. The purpose of this study is to investigate the state of e-government in the United States by examining sectors served by e-government and by reviewing a sample of applications currently in use.

## E-GOVERNMENT SERVICE SECTORS

Creation and maintenance of e-government structures will result in significant technology spending for the foreseeable future. In order to focus these efforts the president of the United States has announced the following e-government goals: increased ease of access for citizens, increased responsiveness to citizens, and increased government efficiency (E-Government Task Force, 2002). The United States government organizes service sectors into four service opportunities as presented in Table 1 (E-Government Task Force, 2002).

*Table 1.*

| Service Opportunity by Sector | Acronym |
|---|---|
| Government to Citizen | G2C |
| Government to Business | G2B |
| Government to Government | G2G |
| Intra-Government<br>Internal Efficiency and Effectiveness | IEE |

### Government to Citizen (G2C)

This service sector focuses on the ability of the government and citizen to communicate information to each other in an efficient electronic manner. One of the most popular benefits of G2C is the simple posting of forms and registrations that were previously available only to those who were willing to wait in line or await mail delivery. Another benefit is the ability to monitor performance such as public schools testing results. Other examples of benefits are prisoner security, voting and jury selection.

### Government to Business (G2B)

This sector focuses on the transactions between government and business with the objective to reduce cost and gather more accurate information. The purpose of this category of service is to allow the government to purchase items, pay invoices, and conduct business more cost effectively, as well as to assist in obtaining data to analyze to assist in decision-making. A goal for this sector is the posting of online regulations for agencies and increasing the electronic tax capabilities for business (i.e., filing W2s on the Internet). Another objective is to consolidate trade information for export/import data, and create a "business compliance" information center. This center will help businesses to check in one place for health, safety, employment, environment, and tax rules (United States International Trade Commission, 2002).

### Additional Private Business Issues

The government-to-business relationship can be extended beyond the need for the government to purchase services. Businesses, such as healthcare or pharmaceutical companies, may need to monitor research or rulings posted by the Federal Drug Administration or may need to examine employment requirements, tariffs and other general information required for business support. Such information could be posted online for easy access.

### Government to Government (G2G)

The government-to-government sector strives to improve the efficiency of service when transacting information between local, state, and federal levels of government. E-government applications benefit this sector by increasing capabilities in terms of crime detection, emergency response systems, law enforcement, and homeland security. An example of this government to government transaction would be to coordinate disaster site information during a crisis by using technology at local, state and federal levels of government.

### Intra-Government Internal Efficiency and Effectiveness (IEE)

This sector concentrates efforts on creating efficient and cost effective systems, particularly supply chain issues. IEE differs from G2G sectors in that its focus is coordination of resources to increase the efficiency of back-office systems. Recent examples of success in this sector were the Department of Transportation Online University that was implemented to reduce training expenses and the creation of an E-payroll system that is projected to save over $995 million in expenses. Other current projects are recruitment one-stop, enterprise HR integration, e-clearance, e-travel integrated acquisition environment and e-records management (White House E-Gov-Internal Effectiveness, 2004).

## SECTOR ANALYSIS

The four service sectors are a form of organization, and specific applications may combine elements of more than one sector. For example, jury selection application could involve all four sectors of service delivery. Jury selection involves the G2C sector (contacting citizens), the G2B sector (using software from the business community), and the G2G sector (coordinating information with the Justice Department and Bureau of Motor vehicles) and the IEE sector (ensuring that jury selection was completed efficiently).

## CURRENT APPLICATIONS

United States e-government applications are multiplying as electronic transactions become the norm. The United States information technology budget was $50 billion in 2004, and it is hoped that this will cause increased efficiencies, thereby driving down costs (Resources for the President's Team, 2004). The context of American e-government is best understood by reviewing the following examples of specific applications.

## Education

Publicly funded education is an important service provided by the United States government (White House E-Gov-Internal Effectiveness, 2004). The enhancement of education with e-government is an important opportunity to improve the educational experience, increase access and accountability while reducing expenses. Public school information is compiled on a national, state, school district, and building level and will give parents the ability to understand how well their school is performing compared to others. Another opportunity for e-government enhanced education is distance learning. All age groups could benefit from new applications that permit access to education despite geographic location or physical disabilities. Distance learning will also assist senior citizens who have difficulty leaving their home but wish to continue their learning. Many universities have distance-learning proposals being developed at this time.

## Prison Guard Systems

Some prisons are now equipped with electronic monitoring systems that track the location of its inmates. Each prisoner wears an electronic bracelet that transmits a unique radio signal every two seconds. If the inmate approaches an area that is forbidden to him, alarms go off. A display monitor shows the identity and location of all inmates and officers. The information is recorded and archived so information can be retrieved as necessary (Wong, 2002). This application of e-government increases efficiencies as citizens do not want tax money to be spent on prison personnel, but want prisoners safely contained. The archived record of activity between prisoners and guards allows clear analysis of any problems and may prevent frivolous and expensive lawsuits (Wong, 2002).

## Tracking and Money Laundering Systems

The ability to track currency and securities movements translates into more information available for investigators but raises substantial personal privacy issues. As more citizens engage in online transactions the potential for abuse grows. Studies show in the year 2001, 30% of Americans have checked bank information online, 16% have moved money between bank accounts online, 8% have bought securities online, 12% have paid with credit cards online (Colby & Parasuraman, 2001).

The Financial Crimes Enforcement Network (FCEN division) sifts through information obtained from the Bank Secrecy Act of 1970 which requires all financial institutions to report large transactions of currency with bank secrecy reporting forms. Data mining techniques that incorporate artificial intelligence algorithms are used to sort through the information. (Daukantas, 2000).

## Voting

The proper administration of voting is essential to the citizen's acceptance of government in the United States. Voting is a labor-intensive process, fraught with opportunities to cheat or manipulate the results. Technology provides an opportunity to automate, reduce labor expenses and provide accountability. Many proposals for voting have been introduced including online voting.

A study by the California Institute of Technology in conjunction with the Massachusetts Institute of Technology Voting Project claims that electronic voting is less effective than actual paper voting (Evans, 2001). The key finding is that wrong vote counts (under or over) are increased with technology. The research refers to these votes in error as residual votes. They claim that paper ballots and lever machines have 2% residual error. Surprisingly, more technical systems have a higher error rate of 3% residual error. Despite this, electronic voting is increasing in popularity and usage. It was estimated that 2% of the population used electronic voting in the 1980's. During the 2000 election, it is estimated that 11% of the voting population used some sort of electronic voting. (Evans, 2001).

## Jury Selection

Companies that provide information technology services to the government have products that enable the government to generate jury lists. Software programs create and maintain jury lists based on voter registration lists provided by the Bureau of Motor Vehicles. Duplicates are eliminated by the use of a unique key such as social security numbers and birth dates. The system provides a jury pool that is representative of age and location requirements. Those who have recently served on a jury are eliminated from the list. This random selection is useful in preventing jury tampering (Maximus: Jury Management, 2004).

## Social Security Administration

The Social Security Administration has the goal of becoming a paperless organization by the year 2010. The Social Security Administration is considered one of the most paper intensive agencies especially because of the need to review original documents in processing claims of death or disability. Citizens may apply online to determine if they are eligible for services and obtain explanations of benefit services. The site allows the user to log on to a previously registered account to get more information about an ongoing issue, or to request notification about changes in pre-selected issues. A searchable database of questions is available as well as calculators to help citizens analyze events such as retirement, disability and survivor benefits (Social Security Online, 2004).

## Bureau of Motor Vehicles

The Bureau of Motor Vehicles is a state controlled registration, but it has links to the federal government. The automation of this department represents time savings for employees and citizens. The federal government Web site "FirstGov.gov" contains direct links for each state's Bureau of Motor Vehicles Web site, available with the intent of accommodating their citizens. The ability to obtain forms and information online is an important benefit for many citizens who do not have time to physically visit an office to obtain a form.

## Law Enforcement Agencies

Law enforcement agencies, faced with technology barriers, have often been unwilling silos of information. E-government structures that link local, state, and federal government agencies reduce costs and enable agencies to share information in order to eliminate redundant activities. Law enforcement agencies are linked in a regional alliance system called regional information sharing systems, and agencies include the Drug Enforcement Agency, the Federal Bureau of Investigation, the Internal Revenue Service, and the Secret Service (Institute for Intergovernmental Research, 2004).

## Emergency Response Systems

The United States focus on homeland defense has heightened interest in improving emergency response systems. Improved systems could help rescuers to find victims sooner and see that appropriate resources are properly allocated. Appropriate e-government applications focus federal aid agencies' responses to those in need of financial help by reducing paperwork and decreasing time required to respond. In a major disaster many inspectors are in the field but there are only limited personnel to handle the influx of paperwork, creating a bottleneck that slows down responses. Proposed systems would use a wireless system to evaluate and report damage in a format that meets federal requirements. The finished product could use hardware such as a personal digital assistant (PDA) to automatically file information into the agency database from the disaster site. Applications of this type could help rapidly deliver funds and resources to where they are needed most (Accela Inc. Government Software, 2004).

## Military Defense

The ability to communicate in the military chain of command in a secure manner is essential to security. The United States Navy and the Department of Defense have created a business plan that will be funded by some portion of the defense budget for information technology improvements. The command has set up a $20 million budget each year to enable the Navy to be an e-business prototype (Onley, 2001). E-government applications certainly fit nicely with military defense as citizens expect economy of resources but demand accuracy with life and death decisions.

In the short term, there is likely to be a slowing of growth of e-government because of recent terrorist attacks (Chiger, 2002). Certain Web sites like the Los Alamos National Laboratories, a government backed nuclear weapon facility, have blocked access to certain documents. It is unclear whether there will be a decrease in the types of information available. The Freedom of Information Act requires that information be made available to the public unless the information falls under the exception of a Special Exemption 2. This exemption says the Department of Justice can block information if it is deemed a vulnerable critical asset. The exemption is amplified by a memo from the Department of Justice in the wake of recent terrorist attacks on the United States (United States Department of Justice Office of Information and Privacy, 2001).

### Mail

The United States Postal Service NetPost.Certified program was developed to authenticate electronic correspondence using smart cards and readers. After a pilot phase it became available to all customers. The customer registers online and then presents himself once at the post office with a photo ID and another document containing their name and address that has been sent through the mail (like a bill that has been mailed to his home address). While there is no charge for the digital certificate, there was initially a $0.50 charge for each email downloaded using the service (Johnston, 2001). The program has expanded to offer multiple services such as: greeting cards, flyers, and post cards. The cost per unit is determined by item and volume and is listed on the Web site (United States Postal Service, 2004).

### Space Exploration

E-government applications are used to organize resources for international space exploration. Current projects involve an international community in multiple locations with highly technical requirements. Project management is complicated by the international aspect of the space program, adding a complicated mix of technology, politics, culture, and interdependence. Coordination is now accomplished using a project management development program from the German software company, SAP. NASA uses this program to manage the financial, human resource, and technology aspects of planning and delivering the launch on time. (SAP Global, 2004).

## E-GOVERNMENT-STRATEGIC CONCERNS

While the benefits of e-government are considerable, it presents new and unexpected concerns such as the widening of the digital divide and the resultant impact on a democratic society. The older, and potentially more conservative, voter may be discouraged from using e-government structures. Older adults in particular are a concern because part of that population may be unfamiliar or reluctant to use technology, or simply may have physical difficulty in reading screens or manipulating keyboards (Becker, 2005). The digital divide may manifest itself in terms of international security when digitally disadvantaged countries fall further behind in the technology race they will have greater difficulty in competing in the global marketplace. Care must be taken to minimize the national and international digital divide at every opportunity through grants, education and the marketplace.

## FUTURE TRENDS

Recent difficulties in maintaining the security and privacy of computer users have slowed the acceptance of e-government by potential users (Mercuri, 2005). While the rate of e-government progress has slowed in recent years more citizens are using e-government as a way to obtain information and governments are gaining real cost savings from the structures (Gov Slowly Gaining Acceptance, but Must Mature, 2004). It is hoped that, as citizens realize the cost savings of back-office reforms, consumer acceptance of e-government will increase.

## CONCLUSION

E-government structures have generated many important benefits, but at the same time have raised some justifiable concerns. An important advantage of e-government is that the government becomes more accountable to its citizens because of increased transparency and the ability to audit transactions. The ability to access e-government from virtually anywhere ensures equal access to services despite geographic location. Automation of government services creates fairness by eliminating barriers to information. Conversely, e-government structures present some disadvantages, such as the considerable expense required to develop and maintain such systems. It is unavoidable that certain citizens have a lower level of comfort and experience with technology, and this could lead to groups of citizens who do not feel they have the opportunity to fully participate in their government. Continuing research may make it possible to develop new and improved applications while guarding against invasions of privacy and security. E-government's success will be dependent on continuing gains in efficiency and consumer confidence.

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## KEY TERMS

**E-Government:** See electronic government.

**Electronic Government:** E-government is the communication between the government and its citizens, businesses or itself by the use of computers and a Web-enabled presence.

**Electronic Voting:** The method by which a citizen casts his vote electronically instead of manually.

**E-Voting:** See electronic voting.

**Government to Business (G2B):** The e-government sector of service in which the government communicates with businesses. This communication can include tax payment by the business, or purchase from a vendor to the government.

**Government to Consumer (G2C):** The e-government sector of service in which the government communicates with its citizens. The word consumer is used instead of citizen because the citizen is treated as a consumer where transaction satisfaction is important.

**Government to Government (G2G):** The e-government sector of service in which the government communicates with other governments. This communication often refers to coordination between state and federal levels of government or coordination between various agencies.

# Application for Comprehensive E-Government

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## INTRODUCTION

E-government forms an essential part of the tendency toward administrative modernization as it embraces the optimization of intra-authority processes; the interface between the authority, citizens, and companies; and interauthority processes, thus leading to the realization of an e-driven informed society. The complexity of the theme results from the doing of authorities; their communication partners like citizens, companies, and other authorities; and the social and legal framework. The growing distribution and the increasing maturity of these e-government applications pose new issues calling for scientists and economists to deliver immediate solutions.

Within the frame of the new public management strategy, the one-stop-shop principle—a central contact-oriented service aimed toward solving problems—has also been in the focus. The portal architecture serves to realize one-stop government for citizens, who are now able to access most various online services of different authorities from one single point to present their concerns. Apart from this, the interconnection between the internal (file) administration through online services rendered to citizens, companies, and other administrative facilities leads to an increased procedural transparency for citizens and companies and forms the basis for one-stop government.

## ONE-STOP GOVERNMENT

The idea to create an e-government pool is heading in the same direction. The pool of portals represents a uniform frame for access to cross-authority Web applications and the administration of related rights. This allows users logging onto their home portals to use additional applications outside their home portals in so-called application portals.

The pool of portals facilitates the incorporation and utilization of external databases (GIS cards, book of prime entry, directories, etc.), which finally provides a continuous cross-linkage.

Thus, the citizen and the officials are able to settle all their issues at a central (virtual) point.

*Figure 1. Flowchart of e-government processes*

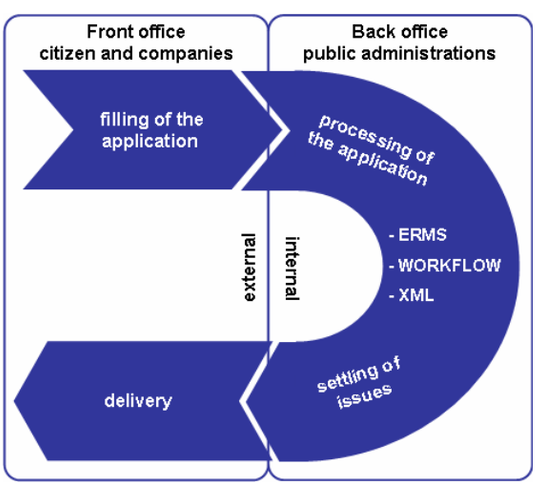
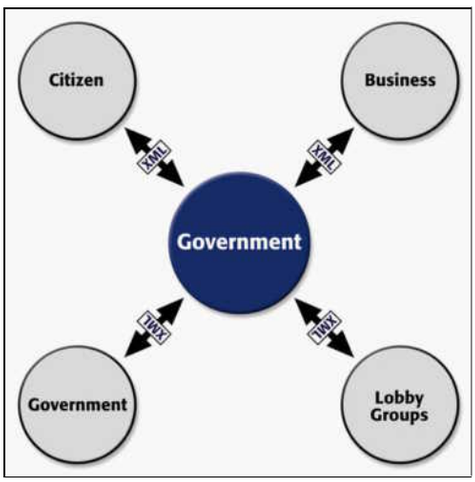


*Figure 2. Communication partners of an authority*




- Through a Web portal, online services, and online delivery, the citizen settles all his or her public issues in a comfortable fashion through the Internet.
- At the authority's site, the citizen is notified of the respective status of the ongoing processing of his or her issue from a central service point.
- A call centre can access the status data of the procedure and is thus able to notify the applicant at any time via phone or SMS if requested to do so.
- Via mobile devices, officials can, at any time and in any place (for instance, through a pool of portals), access electronic files and special applications.

## INTERNAL VS. EXTERNAL E-GOVERNMENT

Typical e-government processes are initiated by citizens and companies (e.g., by way of applications submitted via the Internet), processed within the scope of the internal flow of files of an administrative organization (e.g., using an electronic records-management system [ERMS]) before they are returned to the external applicant (e.g., via the electronic delivery of the administrative decision).

Administrative external e-government means processes that are not part of intra-administrative action in a narrow sense but still fall within the scope of administrative issues. These include above all application processes initiated by citizens and companies, and the participation in processes by other administrative facilities and organizations associated with quasi-administrative tasks.

Administrative internal e-government processes comprise all intra-authority processes (flow of files) in the respective field of work, and cross-authority cooperation in settling issues.

Both the internal and external components are calling for careful planning, monitoring, and control. Different requirements and angles resulting from the external, internal, and cross-authority processing of business objects lead to the separate presentation of problems regarding the required interfaces, standards, and safety requirements. The dual characteristic of e-government processes requires a comprehensive solution in order to provide an implementation of e-government projects as effectively and efficiently as possible. The desired increase of efficiency cannot be achieved unless it is done by means of electronic projection and the linking of all process items, that is, continuous and coordinate electronic processing embracing the complete scale of the filing of an application, intra-authority processing, and delivery.

The concrete adoption of e-government processes and the resulting requirements from an intra-authority and extra-authority angle in the form of software products and their continuous further development are the core contributions of software producers to a holistic approach to e-government-related issues.

## FROM REQUEST TO FULFILLMENT

As we already mentioned above, e-government can be divided into an internal and external scope of activity; in doing so, the internal scope of activity (back office) is generally understood to comprise the processing of business issues using ERMSs and other special applications. The external view of e-government (front office) deals with the communication of an authority with external partners. In this case, the communication partners can be citizens, companies, and nonprofit organizations, but also other public administrations.

The great diversity of external communication partners and the general legal setup provided by public administrative bodies require a very complex technological implementation of e-government systems and call for innovative technologies needed to cope with the resulting demands. The Internet provides the basic communication platform for the transfer of information between citizens, companies, and the authorities as it forms the base for Web-based e-government applications and tools such as online services, online delivery, and mobile devices.

This allows the applicant to submit his or her application on a home PC (personal computer) using online forms in a most comfortable fashion. Field staff officials access the required intra-authority data via mobile terminal devices on the Web. In a similar fashion, external authorities can review the ongoing issue to the required extent, plus the necessary authority can process the respective business issue, if needed, according to specific access mechanisms. Finally, the applicant is sent the settled issue in an electronic form through a delivery server.

## ONLINE SERVICES

In processing an application filed, the incorrect collection of basic business-related data and the resulting information gap tend to cause process delays. In order to avoid this risk, the planning of form sequences forms an essential part of e-government processes, thus serving mainly an improvement in the quality of external data collection as to accuracy and completeness. Form sequences have the task to ensure a clear structuring of the data to be collected on the one hand, and to guide the applicant through application processes including the enclosure of documents, the payment of fees, and the confirmation of the particulars provided via a digital signature on the other.

For example, for the design of online forms in Austria, the Chief Information Office (CIO) published directives within the frame of the e-government style guide (current version 1.2). These directives are designed to ensure a high quality and uniform presentation of the online services of Austrian administrative units. In handling online forms, modular forms have proved effective in the past. This is due to an increased serviceability, structured and more flexible design options, and the application of form layout tools by persons without programming skills.

The subdivision of the application form into form pages and form blocks allows one to save as a temporary file only the blank sections of the application form on the form server in XML (Extensible Markup Language) format. Filled-in and signed parts of forms are submitted to the internal ERMS immediately. This ensures that personal data do not need to be stored temporarily on the DMZ form server.

The involvement of external authorities in the settlement of applications is another vital issue in interauthority cooperation. This means that information needed from an external authority (e.g., registration office) can be incorporated into the proceedings as soon as the citizen has submitted the application without the authority responsible being required to make active contributions.

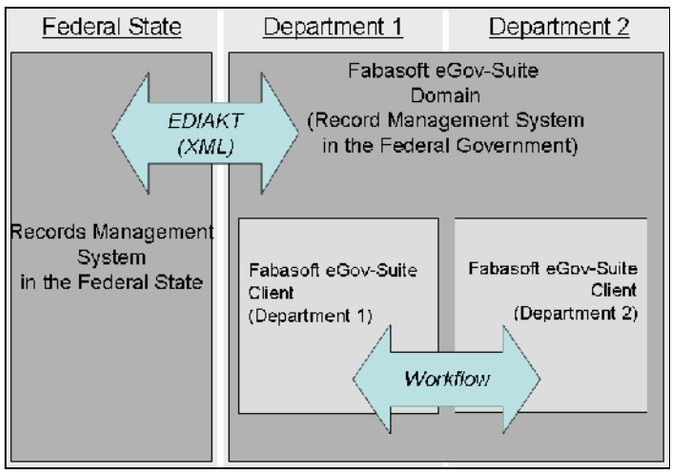
This happens by communicating with the external authority via e-mail after the submission of the application. In doing so, the external authority is requested to check and, if needed, correct or complete the missing particulars within the scope of its sphere of responsibility. For this, it receives special access to the application data receiving only those particulars relevant to its sphere of responsibility. Once the external authority has checked or completed these data, it confirms their accuracy by giving a digital administrative signature.

## FROM THE REQUEST TO ELECTRONIC RECORDS MANAGEMENT SYSTEM

For the acquisition of the data contained in an XML-format application, a flexible and configurable mechanism is required allowing one to control the creation of the case paper (electronic record) containing the application document and the initialization of the work flow for the case paper in the electronic records-management system of an administrative authority. Being controlled by SOAP actions and thus forming the interface between external and internal e-government processes, the data acquisition is substantially effected in three steps: the creation of a case paper, the creation of the application from the XML data, and the initialization of the work flow.

The management of electronic records is one of the most important elements in the government's modernization program and is the base of the government target for online service delivery by 2005. By 2004, all central government organizations should be able to store and retrieve their public records electronically.

*Figure 3. Cross-client exchange of files: EDIAKT and ELAK work flow*




For electronic file and case processing and archiving, the European countries have adopted their national concepts. These concepts differ as to the structural and procedural organization. Electronic records-management systems usually offer functionality for document management, content management, work flow, and the archiving of documents and files, and they involve other special applications like digital signatures or conversion services. Examples of specific ERMS concepts are the following:

- DOMEA in Germany
- ELAK in Austria
- GEVER in Switzerland
- The National Archives in the United Kingdom

An example of an electronic records-management system is the standard software product Fabasoft eGov-Suite. Fabasoft eGov-Suite offers a document-management system with work flow and consists of a functional core applicable throughout Europe plus tested and certified country-specific modules complying with the national requirements and regulations.

## CROSS-AUTHORITY EXCHANGE OF FILES

The electronic handling of records offers the huge advantage of several users able to access the same file. This facilitates intra-authority but also interauthority processes. The joint utilization of electronic resources and the avoidance of redundancies help to provide synergy effects that reduce cycle time and costs of proceedings.

For example, the interface underlying the cross-authority exchange of files in Austria is called EDIAKT. Another example is the interface XDOMEA in Germany. For both, the base technology offers XML.

Files and documents are exported from the system using predefined XML patterns and are then ready to be sent off via electronic media such as e-mail or Web services. Thus, EDIAKT allows cross-authority cooperation through various channels such as the exchange of files or access to files on a cross-community, -state, or -ministry scale.

In Austria, the project ELAK im Bund (EIB; Electronic Records Management in the Federal Government) is an example of this, where cross-authority processes have been implemented through an XML interface. If a case paper transported in an EDIAKT-conforming manner is imported into the internal ERMS through a known XML pattern, the existing file is updated or, in the event of a new file, a new file is created. All metadata contained in the file, the documents stored in the file, and work-flow information are applied before the work flow is started according to the subject area as a predefined process or with a start activity in case of ad hoc processing.

In the event that several authorities use one system in a multiple-client environment, the functionality of EDIAKT

is not indispensable as all persons dealing with a case are working within one and the same work-flow system. The implementation and configuration of several clients within one domain allows client-specific settings and coordinate access rights without affecting the handling of other clients.

The implementation of ELAK im Bund with the European standard software Fabasoft eGov-Suite is also an example of the cross-authority exchange of files through work flow. The ministries are assigned states as own their clients and are within one EIB domain. All documents and files are handled depending upon the individual client. However, these documents and files can be handed over to other ministries through the work flow. Access is controlled through an ACL (access control list). In doing so, the processing rights can be assigned actively for the process period through orders issued to other ministries and organizational units.

## ELECTRONIC DELIVERY

Electronic delivery means the supply of documents via electronic channels. Citizens will no more receive administrative decisions by post, but will get the documents via the Internet through an electronic delivery service.

In Austria, the last step of comprehensive e-government has been made possible by the concept for the electronic delivery server ZUSE (current version 1.0). The model of the electronic delivery server of the Austrian Chief Information Office describes the foundations and the process model of electronic delivery. While doing so, the directives defined recommend the use of a modular, universal, and efficient delivery service regarding interfaces, infrastructure, the submission of supporting documents, and signatures on the part of both the citizen and the authority. This includes the process description and information format of electronic delivery, one LDAP pattern description, one XML specification of the data structure, and the utilization of the online application container (OLAPP). Within the frame of the model of electronic delivery, the digital signature given by the authority is worked on by the development of another MOA (modules for online applications) model for generic server signature components.

An example of an electronic delivery system according to ZUSE 1.0 is Fabasoft Delivery, which fulfils all requirements and directives for the electronic delivery of administrative decisions.

## EXAMPLES FOR STANDARDIZATION AND INTEROPERABILITY

Scenarios of this kind require highly developed networks in intra- and interadministrative communication. In order to accomplish this, tools based on well-established technological standards are an indispensable means to use. Technological standards, directives, and recommendations for communication via the Internet are primarily specified through global organizations such as XML, WAI conformity standards, or the SOAP recommendation issued by W3C (World Wide Web Consortium). These endeavours directed toward standardization must be supported by all sides because no lasting interoperability can be ensured if the development pursued fails to orient itself by standards.

### W3C WAI Conformity

WAI (Web-content accessibility guidelines) issued a directive for the design of Internet presentations that can also be visited by disabled persons without additional barriers, thus ensuring free access to the Internet for any person.

Applications for online services work according to the principle of the separation of content, layout, and structure. This allows the creation of online forms and Internet presentations for different types of publications and presentations (Internet, WAI, print view, WAP, etc.)

### Interworking of MOA Modules

The MOAs specified by the Austrian Chief Information Office offer basic services, for example, in the field of the electronic signature for creating safe online procedures. In the MOA-SP basic module, all functionalities for signature verification are enclosed, thus enabling online applications to access these (basic) functionalities. In doing so, both security-layer conform signatures and XMLDSig and CMS signatures are supported. By analogy, the MOA-SS basic module encloses the entire functionality for the server-based creation of signatures. In MOA-SS, security layers and XMLDSig conform signatures are supported.

### Identification by Smart Card (Citizen Card)

The use of a smart card for identification (citizen card) calls for the definition of an interface between the smart

card and the application. An example of such an interface is the security-layer specification in Austria. It is the interface between the Austrian citizen-card environment and the applications and has been implemented as an XML interface.

## Style Guides

The electronic applications submitted on the Internet that are being developed within the frame of e-government projects of the federal government, the federal states, and communities should be based upon a nationwide regulation and maintain one uniform structure independently of the authorities they are operated by. This applies to the handling of the electronic application procedure, the structure of standard data, and the layout, which should be largely uniform.

## CONCLUSION

From a technical view, a comprehensive e-government scenario can be resolved accomplishing international and national concepts, standards, and guidelines. However, due to heterogenic hardware and software infrastructures, successful implementations are difficult and complex, which only can be solved by further international standards.

E-government projects must be understood primarily as organizational projects and not only IT projects. E-government presupposes a different thinking in processes, which leads to a cultural change from traditional paper filing to electronic filing and work flows. Additional clear directives from management are needed as well as the creation of a proper legal framework. Nevertheless, e-government must be seen as an alternative distribution channel that offers public authorities other service possibilities.

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## KEY TERMS

**Citizen Card:** Smart card for citizens for electronic identification when using e-government online services.

**Comprehensive E-Government:** Official channel through which activities from the filing of an application through electronic records management to electronic delivery is done only through electronic systems without paper.

**Electronic Records Management:** Management of electronic files and documents.

**Interauthority Processes:** Processing of business issues using electronic records-management systems and other special applications between different administrative authorities.

**Intra-Authority Processes:** Processing of business issues using ERMSs and other special applications within one administrative authority.

**One-Stop Government:** A central contact-oriented service aimed toward administrative concerns.

**Online Services:** Services offered through the Internet.

# The Application of Single-Source Publishing to E-Government

A

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## INTRODUCTION

The following article provides an introductory overview of Extensible Markup Language (XML) and how it may be applied to certain processes of e-government to improve accessibility to government services as well as to make governments' services more widely available. In particular, this discussion explores how the kind of single-source framework used in digital publishing can be used to drive the storage, delivery, and exchange of e-government information and services. The first section of this article provides a basic introduction to XML. The second part illustrates how content is prepared and disseminated using XML, providing some existing and hypothetical examples of this single-source approach. The final section looks at future trends as well as some of the challenges that may be encountered when using this XML-based single-source framework.

## BACKGROUND

A central technical dimension of e-government continues to be the dissemination of information to citizens, as well as between government agencies, stakeholders, and other groups. The most visible and largest growing area of e-government in recent years is the use of the Internet and World Wide Web to deliver government information and services. Between 1996 and 2001 alone, the number of official government homepages throughout the world grew from less than 50 to over 50,000 (Ronaghan, 2002, p. 5). As Abramson and Morin point out, it is now expected that public, private, and not-for-profit organisations will have a Web site: "the key question today is not whether organisations, including those in the public sector, have Web sites, but what is the quality of those sites and the scope of services being provided online" (Abramson & Morin, 2003, p. 4).

From a user's perspective, this technology makes it easier for people to gather documents about government and politics, become involved in political discussion groups and collaborate to organise certain political activities (Davis & Owen, 1998). From a content provider's perspective, the scope and scale of e-government activities, ranging from any official government online presence to the full integration of e-services across administrative boundaries (Ronaghan, 2002), necessitates the need for effective and efficient ways of disseminating content to this range of users across a variety of contexts.

With the diffusion of information and communications technology, such as the Internet, e-government faces three closely related imperatives:

1. The need to disseminate information to different outputs (e.g., Web, print);
2. The need for citizens and other stakeholders to access this information from a variety of contexts (e.g., work, home, public kiosk); and
3. The need to be able to share this information with different individuals and groups (e.g., government agencies, NGOs, multi-stakeholders) in an efficient and effective way.

XML has been developed from the experiences of commercial and government organisations seeking to store, display, and disseminate large volumes of information. It is a metalanguage used to mark up content[1] for delivery across multiple platforms and to different kinds of users. XML is used to describe how different kinds of data are stored, exchanged, and presented. XML has been particularly successful in digital publishing and certain areas of e-learning.[2] In its application to digital publishing, XML "provides a well-defined, broadly accepted syntax for creating markup schemes to [enable] the development of tag sets focused on projects as small as a single book or journal ... or whole collections or classes of books or journals ... or to achieve a particular functionality" (Kasdorf, 2003, p. 87).

The use of XML within a single-source publishing approach to the production, storage, and exchange of information is by no means new and has a wide range of applications to e-government. A single-source approach

involves a process in which a master source of information is prepared using XML to make that information available to end-users through print, the Web, and a variety of other platforms as necessary. The major advantage of this single-source approach is to make content reusable and accessible via a range of media.

The following discussion seeks to provide an introduction to XML and outlines how it can be used to encode a single source of content in such a way that it can be used in different ways and formats for online, printed, and other delivery platforms according to the needs of end-users.

## XML: An Overview

XML is a text-based metalanguage that is "extensible," or customisable, enabling users to construct their own specialised markup languages to transmit data (Bray et al., 2004; Bradbury, 2001). XML serves a rule-based system "designed for marking up content of all sorts (text, graphics, computer code, commercial information, intellectual information) in order to specify what the component parts of that content are, and to describe them" (Kasdorf, 2003, p. 91). XML users can create their own tags to act as hidden labels to annotate the content, be it for a Web page or sections of a text within a page (Berners-Lee, Hendler, & Lassila, 2001).

Development of XML began in 1996 under the auspices of the main standards body for the Internet, the World Wide Web Consortium (W3C), as a subset of Standard Generalised Markup Language (SGML) that would be easier to implement on the Web (Bray et al., 2004; Bosak & Bray, 1999). XML originated in the commercial and governmental use of SGML and Hypertext Mark-up Language (HTML). XML's designers drew from: (1) the positive aspects of SGML; while (2) seeking to address some of the limitations of HTML as a mark-up language (Kasdorf, 2003).

XML is a restricted form of SGML (Bray et al., 2004). SGML (Goldfarb, 1990) has been widely used in manufacturing, medicine and aerospace industries, as well as public administration, such as the US Department of Defence and Internal Revenue, to enable contractors and suppliers to exchange large technical documents, and for other large publishing applications (Bosak & Bray, 1999; Kasdorf, 2003, Salminen, 2005). As a subset of SGML, XML provides a standard basis for industries, organisations, and individuals to exchange information, using their own vocabularies and structures, as well as a data interchange between software applications.

Rather than replace HTML, which is primarily a presentational format designed for a specific way of viewing content on the Web, XML is "in its best use, a *source* markup, designed to be transformed into something else, to be archived and used in different ways…XML retains the information about what the elements in the source content *are* and how they *relate*; HTML typically loses that information, focussing instead on what the content should *look like* in a given presentation" (Kasdorf, 2003, p. 91).

Like HTML, XML makes use of tags (words bracketed by "<" and ">") and attributes. Unlike HTML, which has a fixed set of tags, XML has a potentially infinite number of tags. It enables users to define and use their own tags but "has no built-in mechanisms to convey the meaning of the user's (i.e., content providers) new tags to other users" (Berners-Lee, Hendler, & Lassila, 2001, p. 32). Users of XML can assign explicit meaning to data stored in an XML file, using tags to delimit portions of data without having to specify how that data will be interpreted by the application processing it. HTML, on the other hand, specifies the meaning of tags and attributes, and how a browser will display the text between tags.[3] For example, using a "<p>" tag in XML does not necessarily have to define a paragraph, as it does in HTML, but can signify any attribute created by content providers to suit their specific needs and in a language that they understand.

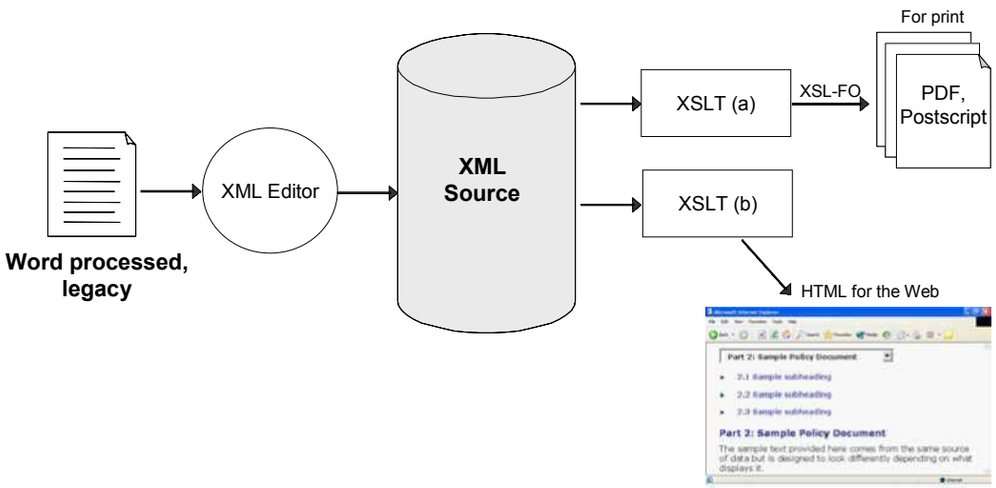
## How XML Works: A Sample Workflow

It is not uncommon for government information to be made available online in a Portable Document Format (PDF), Microsoft Word (DOC) or Rich Text Format (RTF) in the form of a single file suited to printing in hardcopy. Often, the file displayed online is text-based, static, and identical to the printed version, because the content is taken directly from printed source files stored in PDF, RTF, and/or Word. Alternatively, data is stored in multiple sources and formats (e.g., PDF, HTML, RTF, and MS Word) leading to inefficiencies in data management and unnecessary duplication of labour.

Generating single-source content using XML involves a multi-stage process that may take place in a number of ways. For example, the initial document may be created directly in XML or repurposed from RTF or Word and then exported into a source XML file. This source file may then be transformed into other XML vocabularies for print, the Web, or other outputs. A single-source approach requires that content be 'captured' early on at the authoring and formatting stage so that content can be marked up for multiple outputs in a unified process.

This source XML file may be structured and tagged according to a Document Type Definition (DTD) suited to the type of content intended for storage and dissemination (Bray et al., 2004). A DTD is a kind of template for the XML file. It is a separate file that defines what goes where

*Illustration 1. Using XSL to Transform a word processed document into multiple outputs—a basic example*




within an XML document and in what order, what the attributes of the content are and how they are structured in relation to each other. The XML file is written to comply with a DTD to ensure that the document can be effectively processed in XML.[4] Once the DTD has been written for one set of generically structured content, it can be applied to a range of similar documents featuring a similar structure.

While there is no definitive approach to structuring XML documents, the construction of DTDs requires a carefully planned process of modelling to identify the structure of the content. The model depends on the type of content; however, a number of generic DTDs have been defined and released to the community to use, such as DocBook, which is a general purpose XML DTD specifically suited to book and journal publishing. DocBook features a schema in a relatively simple format that is freely available. While DTD syntax is fairly straightforward to understand, the challenge is to create a model that is applicable to the type of content being disseminated.

Extensible Stylesheet Language (XSL) can then be used to transform the XML source into various outputs. XSL is the standard stylesheet language for XML that includes a vocabulary for specifying how content can be used to transform a source XML file into various XML vocabularies or to other formats (e.g., HTML) (Bosak & Bray, 1999). This process of transforming XML into other formats uses Extensible Stylesheet Language for Transformation (XSLT) (Clark, 1999).

XSLT can be used to transform a single-source XML document into a multitude of outputs for the Web, for print, as an image file, a new XML document, or any number of outputs. It is one of the most important aspects of an XML environment because it enables tagged content to be interpreted by a stylesheet and rendered in way that end-users can understand (e.g., via a Web-browser). Illustration 1 provides a basic example of a workflow using XSLT, in which one XSLT is used to produce a print document format (PDF), while another XSLT is used to produce a Web-based output.

The previous example illustrates the process in which a source file is exported to XML from a master or legacy document authored in a standard word-processing software package (e.g., MS Word) using an XML editor[5], and then converted to two outputs—PDF and HTML–using separate Extensible Stylesheet Transformations.

As shown in Illustration 1, one XSLT (a) is used to generate a printed version from a source XML file. A process for Extensible Stylesheet Language Formatting Objects (XSL-FO) creates a paginated print version of the data stored in that source file. XSL-FO is a page

description language which tells a formatter how to structure text on a page (e.g., specifying the size of margins). The source XML document is transformed into FO using a stylesheet and rendered as a file format suitable for printing, such as PostScript and PDF.

Within this single-source framework, the paper-based version generated from the XML source file can look like and be structured as a normal paper-based document; however, the online version of that same content can be dynamically generated and reformatted in an automated process to be more "Web-friendly," interactive and customised to end-user needs. The second stylesheet (b) in Illustration 1 specifies that only online features tagged in the XML source file are recognised when the file is transformed for online display in HTML.

Stylesheets can be applied to transform a single-source of content into formats suitable for a wide range of outputs to expand and enhance access. For example, stylesheets can be used to filter, reorder, and render the data in print or with graphics on a Web page, as text on a handheld organiser (e.g., personal digital assistant [PDA]), into Braille or as audible speech on a telephone, or other platform as necessary (Bosak & Bray, 1999). Further examples and illustrations of this are provided.

## Using XML as a Storage medium

The ongoing need to find more inexpensive and environmentally-friendly ways of storing, maintaining and disseminating information is an important consideration of e-government. XML is useful for content management because it can be used to tag data for customised storage (Bradbury, 2001).

It is possible to store different kinds of information about information, or "metadata," within a source XML file. In a single source approach, the source XML file serves as a container for metadata. Metadata consists of attributes and values that identify, for example, the language in which the document is written, the author, publication date, security, rights information and revision version. Metadata adds value and utility to data by enabling the information within the XML document to be understood, manipulated and customised by others. For example, when a specific type of user requests a document online, the database driving the Web site can be programmed to find the data tagged at the level and covering only the subject matter required by the end-user (e.g., as a citizen, policy specialist or parliamentarian). Metadata may be added so that selected parts of the document are automatically extracted from the single source in the form of an executive summary featuring key topic headings. Metadata can also make the data more searchable, depending on how much metadata is used to describe the content. (A practical example of this is the Tasmanian Legislation Web site, which is described in further detail as follows.)

## Minimising the Duplication of Data and Labour

Specific tags and metadata can be used to break the content up into modules that are easier to update. A key strength of using XML in a single-source approach is to reduce the duplication of labour and data. Generic information that remains the same across a number of contexts such as copyright information need only be tagged once.

Rather than modify each different version for specific outputs, it becomes possible to edit and manipulate one source of content. For example, a group of policy documents may feature the same standard copyright page. This page would only need to be marked up once and automatically generated and inserted into the group of policy documents as necessary.

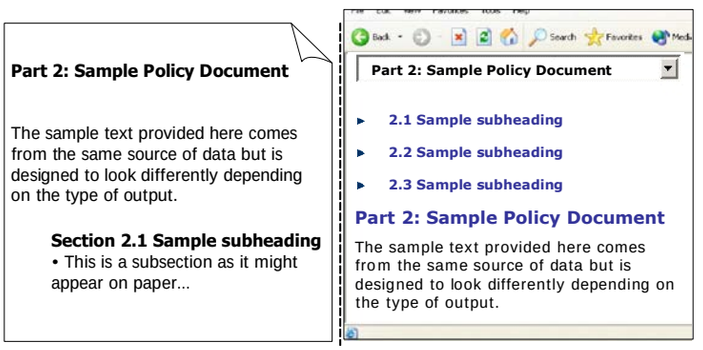
Despite these longer-term benefits, a lot of work is required to develop XML elements within a scheme of data management and formatting for a given source of content. Deciding on which content is generic requires careful consideration (e.g., determining which content is common to all output versions of a given document, as well as potentially used in other documents). As a corollary of this, considerable effort is required in determining the "granularity," or level of detail, to which a given chunk of content should be tagged.

Creating a customised language for the encoding, storage and display of data involves organisational challenges in keeping track of the variants in language and how they work. Those involved in the production/delivery of content have to implement the languages describing this content according to a common standard.

## Making Data Exchangeable through Standards

XML is designed for document exchange. Since 1998, W3C (2003) has recommended XML as a standardised approach to data-handling. XSLT was one of the first XML standards to be established by W3C, making it possible for changing vocabularies to be incorporated into the life-span of a given document by using this method of transformation to convert one set of data description into another. According to Bosak and Bray (1999), "XML bridges the incompatibilities of computer systems, allowing people to search for and exchange scientific data, commercial products, and multilingual documents with greater ease and speed" (p. 83).

*Illustration 2. Divorcing display from content—two outputs from the same source*




A major advantage of XML is its openness. XSLT and XSL-FO are based on open standards, and the software to work with these technologies is freely available. Because XML has become a standard for open information interchange, content providers do not have to depend on commercially developed proprietary, closed standards; nor do they have to depend on specific vendors or software[6] to apply them, which can be extremely expensive.

This is one of the reasons why XML has been adopted as a data interchange format in areas such as digital publishing. This openness is important to digital democracy as governments increasingly mandate the use of open standards in the development and use of ICTs for administration and service provision. On an international scale, open standards are critical to the effective exchange of information by multi-stakeholders across diverse contexts and systems.

Another benefit arising from standards is the capacity to "future-proof" data against changing needs and technologies. As XML is useful for storing information that will be presented in a variety of formats, it can also be useful as an intermediate step for transforming from one format to another. XML can be converted to other formats relatively easily, so that even if XML becomes obsolete, the source XML file can, in principle, be converted to the new standard.

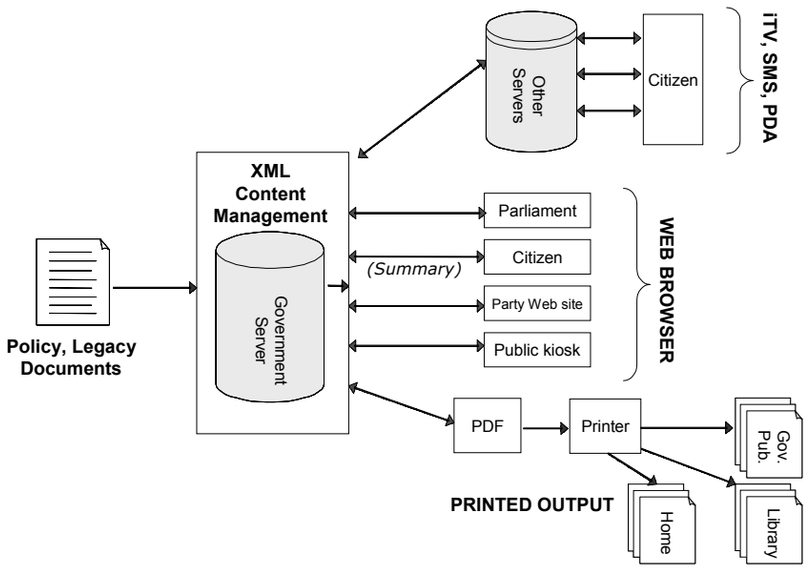
## Using XML to Display across Multiple Platforms and Devices

Effective e-government necessarily involves the dissemination of information and services to users with different needs, and who access information and services from a diverse range of contexts and platforms. XML can be used to define how the content is stored without having to specify how it will be displayed (Bradbury, 2001). Source-content marked up with XML tags can be displayed on a variety of devices (Bosak & Bray, 1999).

This ability to divorce display from content is possible using separate stylesheets. As previously mentioned, the same source of content used for the printing process can be used for the Web; however, each output uses its own XSLT so that they look and function differently. Illustration 2 offers a visual comparison of how a printed and online version derived from the same source of content can appear differently according to the means of output.

XML can be used for multi-channel display systems, such as interactive television, personal digital organisers, and mobile phones. The same source of content can be made available to speech-based applications, Braille and Wireless Markup Language (WML) for mobile devices, by writing another XSLT transformation to convert the

*Illustration 3. An example of single-source publishing*




source to the required output. Content can therefore be made more accessible to users with special needs.

The multi-output capabilities of a single-source approach are shown in Illustration 3 in a model based on the kind of centralised content aggregation framework used in digital publishing (see Merceica, 2001, p. 81). This illustration shows how a single source of content can be used across multiple outputs using XML.

Selective versions of a given document can be dynamically created on demand in response to an end-user's request. It is possible to also specify that only parts of a given document appear on certain Web sites and other outputs. The same content can then appear differently through different outputs according to the needs of users and according to the design motif of that output.

## Two Examples of this Single-Source Approach

The Tasmanian Legislation Web site (www.thelaw.tas.gov.au) provides a good illustration of this single source approach. First developed in 1998, this Australian State Government Web site uses a single-source approach legislative drafting and maintenance system to enable extensive searching and browsing facilities. Underpinning this system for the automatic consolidation of legislation is a database system that supports the import and export of documents marked up in SGML/XML. All legislation in the database is broken up into chunks for each Section or Schedule of legislation, which contain information such as the dates for which each particular fragment of legislation is in force. When legislation is amended, the system automatically joins these fragments on demand as/when the legislation is affected by amendments. (The old fragments are archived for historical reference. A complete history of Tasmanian principal legislation has been maintained in the system since implementing the database in 1997.)

The system enables legislation drafters to mark up an electronic version of any given consolidated Act and provide access to electronic searching facilities to aid in the preparation of consequential amendments.[7] Whereas legislation was traditionally drafted using manually pasted-up copies of legislation in conjunction with manual indexes (Arnold-Moore, Clemes, & Tadd, 2000), this approach offers a number of benefits, such as: "drafters can work from consolidated legislation to prepare amendments; a version of the Principal Act can be printed showing how it will be affected by amending legislation (the marked up changes can be read in conjunction with the amending legislation); and standardisation of wordings for amendment legislation improves overall readabil-

ity" (Department of Premier and Cabinet, Tasmania, 2005). Another benefit is the automation of processes, such as the consolidation of amendment legislation on commencement, and multiple format delivery for the publication of legislation (e.g., to paper-based printed documentation, CD ROM and HTML publishing via the Internet, along similar lines to Figure 3).

A number of similar developments in the management of legislative documentation have taken place elsewhere, such as Estonia (Heero, Puus, & Willemson, 2002) and the US House of Representatives, which has initiated plans to draft the vast majority of bills in XML (Carmel, 2002; Salminen, 2005).

To provide a more sophisticated hypothetical example of how the framework shown in Illustration 3 may be applied in a more sophisticated way, consider the following scenario: a piece of constitutional reform under debate in parliament is marked up using XML to be presented differently according to who is reading it. A citizen, whose information and communication needs differ to those of the parliamentarian, may require only a summary of the document. Furthermore, this summary is integrated into other media, such as net casts of parliamentary debate and related online discussion forums so that the end-user can refer to the summary as she watches and discusses the debate through her home PC entertainment system or interactive television or public kiosk. She can access the content through other means, such as an electronic handheld organiser or networked public information kiosk.

## FUTURE TRENDS AND CHALLENGES

### Implementing XML

Bosak and Bray (1999) rightly point out that "Unlike most computer data formats, XML markup also makes sense to humans, because it consists of nothing more than ordinary text" (p. 81; see also Bray et al., 2004). Nevertheless, adopting XML involves an extensive process of implementation. The initial outlay of human resources and finances can be considerable, not only because of the technical requirements for XML, but also because development of a single source of content intended for multiple outputs may present a radical departure from conventional processes and workflows.

Familiarisation with the basic standards of XML is necessary for those involved in the process of content development and dissemination. From a document management perspective, for example, users have to conform to the strict rules stated in a DTD. This presents challenges to conventional approaches by authors of content, as law-writers working within the Estonian legislative system have encountered (Heero, Puus, & Willemson, 2002). Extensive in-house and external training may be required in handling content markup in XML.

A major challenge in developing an XML source is granularity; that is, to what level of detail should the content be tagged. Careful thought needs to go into why levels of tagging need to take place, how content is best structured and what naming conventions are best suited to the current and future use of data. For example, will the use of a certain XML tag in one area of governance make sense to other users of the data, both now and in future?[8]

### Developing and Maintaining Standards

Continued support is required from standards bodies and their contributors. While standards for data vocabularies and the methods of tagging and describing information have progressed significantly in recent years, there is an ongoing challenge to implement, develop and maintain them because they require close cooperation between parties seeking to share and use the data (who may be in competition with each other) (Kasdorf, 2003).

Central to the effective sharing of information is the development and consensual adoption of common standards. Currently, there are a number of initiatives to define common metadata terms in document publishing (e.g., Dublin Core, 1999); however, there are a variety of different industry-specific standards currently in place. Because standards are still in their infancy, methodologies for the efficient exchange of information articulated in a common vocabulary are currently underdeveloped. Crucial to the effectiveness of standards is agreement and conformity between content providers and users to ensure that these standards are formalised. It also important for vendors to produce software that enables these standards to be effective and maintainable.

### New Technologies

Three developments in XML are worth highlighting in relation to the single-source approach outlined in this article. Firstly, there is a stricter reformulation of HTML that is compatible with XML called Extensible Hypertext Mark-up Language (XHTML). Secondly, a number of XML schema languages have been developed to replace the use of DTDs with more straightforward, compact, and easily manipulated forms of XML syntax. Like DTDs, these schemas describe the structure of XML documents

but allow for advanced forms of data-typing. Thirdly, is the importance of XML to the development of the Semantic Web (Berners-Lee, Hendler, & Lassila, 2001, p. 32), which has been promoted as "a next-generation Web designed to make more kinds of data easier for computers to locate and process" (Associated Press, 2004). Where current search engines for the Web are designed to be browsed by people, the designers of the Semantic Web are seeking to improve the automation and therefore speed, efficiency and search-ability of the Web by developing a system that is browsed by computers *for* people. A definition of Semantic Web is best left to its architects and advocates:

*To date, the World Wide Web has developed most rapidly as a medium of documents for people rather than of information that can be manipulated automatically. By augmenting Web pages with data targeted at computers and by adding documents solely for computers, we will transform the Web into the Semantic Web ... Computers will find the meaning of semantic data by following hyperlinks to definitions of key terms and rules by reasoning about them logically. The resulting infrastructure will spur the development of automated Web sources such as highly functional agents* (Berners-Lee, Hendler, & Lassila, 2001, p. 30).

Also central to the development of the Semantic Web is the resource description framework (RDF). This system for describing relationships between data resources can be expressed in XML to build the kind of metadata that will make the Semantic Web possible. RDF, it is argued, will enable faster and more accurate data retrieval (Bosak & Bray, 1999, p. 81).

## CONCLUSION

XML is useful because it provides a set of rules, guidelines, and conventions for encoding, structuring, and manipulating data. This discussion of XML is only introductory and covers just a few of the technologies available to content providers seeking to enhance the storage and dissemination of government information and citizen resources to users across different outputs and contexts. Indeed, several solutions similar to the frameworks outlined above have been already been built already before XML using SGML. Nevertheless, the single-source approach proposed in this article has potential application across a number of levels and processes of e-government. It could be used to disseminate a range of information, such as a constitution, the development, and consultation of policy, to legislative development.

While data storage, exchange, and dissemination form only one dimension of digital government, developing effective technologies is a keystone to building a sustainable, usable, and effective information society.

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A

## KEY TERMS

**Document Type Definition:** A specific syntax and vocabulary for formalising an XML document in a language that enables a computer to interpret it (Kasdorf, 2003, p. 97). It provides a grammar for a class of documents (Bray et al., 2004).

**Extensible Hypertext Markup Language:** A stricter reformulation of HTML, compatible with XML.

**Extensible Markup Language:** A meta-language that provides a set of rules, guidelines and conventions for encoding, structuring, manipulating and exchanging data. The acronym "XML" refers to the language itself and to a whole family of standards that have developed around it, such as XSL (Bray et al., 2004; Kasdorf, 2003, p. 88).

**Extensible Stylesheet Language for Transformation:** Used to transform XML into a multitude of outputs for the Web, for print or any number of outputs. XSLT enables tagged content to be interpreted by a stylesheet and rendered in way that end-users can understand (e.g., via a Web-browser) (Bray et al., 2004).

**Extensible Stylesheet Language Formatting Objects:** A page description language that tells a formatter how to structure text on a page (e.g., specifying margin sizes).

**Extensible Stylesheet Language:** A standard stylesheet language for XML stylesheets, which includes a vocabulary for specifying how content can be used to transform an XML file into XML vocabularies or to other formats (e.g. HTML) (Bosak & Bray, 1999, p. 83).

**Hypertext Markup Language:** The first version of HTML was published in 1992 as an SGML-based language to describe Web pages. HTML is a "language used to encode formatting, links and other features on Web pages" that uses standardised tags whose meaning and interpretation is set universally by the World Wide Web Consortium (Berners-Lee, Hendler, & Lassila, 2001, p. 32).

**Portable Document Format:** A widely adopted page description language.

**Rich Text Format:** A specification by which formatted text and graphics is encoded for transfer between applications.

**Standard Generalised Markup Language:** Developed "for supporting the management of heterogenous information resources of the Internet and to facilitate communication between various software applications" (Salminen, 2005). (See Goldfarb, 1990.)

**World Wide Web Consortium:** Founded by Tim Berners-Lee, inventor of the World Wide Web, W3C includes Member Organisations ranging from product vendors, service providers, publishers, corporations, academic institutions to governmental bodies, who seek to evaluate and develop proposed technologies for the Web, such as HTML and XML.

## ENDNOTES

1 The author uses the term "content" to encompass all text, illustrative and audio-visual materials made available for delivery via print, the Internet and other media.

2 This article derives its applied understanding of XML from work conducted between 2001 and 2003 at the International Baccalaureate Organisation's Online Curriculum Centre (IBO). An overview of this work within an educational context was presented by the author as a paper entitled: "Using extensible markup language for the single source delivery of teaching resources via print and the Web: A practical example" at the conference of the Australasian Society for Computers in Learning in Tertiary Education, 5-8 December 2004, Perth: Western Australia.

3 For example, HTML uses standardised tags such as <H1> and <BODY> whose meaning and interpretation is set universally by the World Wide Web Consortium (Berners-Lee, Hendler and Lassila, 2001, p. 32).

4 Unlike HTML, which will typically attempt to display a Webpage even though it may be missing certain tags, XML is far less tolerant of missing tags or other encoding errors. This "draconian error handling" is deliberately designed to promote stability in data-handling (Kasdorf 2003, p. 91).

5 A number of software packages available which plug in to desktop publishing and word processing applications, such as Microsoft Word, enabling users to tag content from within the application.

6 As Kasdorf (2003) points out, it is useful to remember that while PDF is a widely adopted page description language, it remains a *de facto* standard controlled by Adobe Systems.

7 For an example time-line of legislation, see Figure 2 in Arnold-Moore, Clemes, and Tadd (2000).

8 For a more detailed examination of some these challenges within the context of the Estonian legislative system, see Heero, Puus, and Willemson, 2002.

# Applications of E–Commerce in Government

A

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## INTRODUCTION

Electronic commerce, or e-commerce, is simply business that is conducted over the Internet. Government e-commerce applications are those e-commerce applications utilized by some level of government, whether it is federal, state, or local. In this article, we will distinguish between interactive transactions and e-commerce transactions. Strictly speaking, e-commerce applications are only those in which a financial transaction of some sort takes place. Interactive transactions would involve interaction with a Web survey or some other application like filing an online form requesting services or submitting a complaint, but financial transactions are not included. Electronic commerce applications are an important segment of the growing e-government service delivery field. Government e-commerce applications may involve G2B (government-to-business), G2G (government-to-government), or G2C (government-to-consumer or, in this case, citizen) mechanisms.

Table 1 provides examples to illustrate the differences between e-government activities like information provision, non-e-commerce interactive transactions, and e-commerce transactions.

## IMPORTANCE OF E-COMMERCE APPLICATIONS IN THE PUBLIC SECTOR

E-business and e-commerce has grown very rapidly throughout the U.S. and international economies, along with the Internet itself. In 2005, there were an estimated 604 million worldwide Internet users; 159 million were estimated to reside in the United States (U.S. Central Intelligence Agency, 2005). This increase and the rapid change and growth in technology led to a burgeoning of interactive service delivery and retailing over the World Wide Web, or e-commerce. The U.S. Census Bureau estimated e-commerce activity in the third quarter of 2005 at $22.3 billion in adjusted dollars, an increase of 5.7 % from the estimates of the third quarter of 2004. In the third quarter of 2005, e-commerce sales had grown to 2.3 % of total retail sales and was still growing (U.S. Census Bureau, Economics and Statistics Administration, 2005).

In 2002, the U.S. Department of Commerce found that 30.9 % of all Internet users over the age of three had used the Internet to search for government services (U.S. Department of Commerce Economics and Statistics Administration, 2002). As more recent data from the Pew

*Table 1. Examples of e-government information provision, interactive transactions, and e-commerce transactions*

| | Information Provision | Interactive Transactions | E-Commerce Transactions |
|---|---|---|---|
| **G2C (Government to Citizen)** | Provision of information and forms via .html pages, .pdf files or forms | Complaint forms to be completed by citizens | Online purchase of birth and death certificates, hunting or fishing licenses, or renewal of drivers licenses |
| **G2B (Government to Business)** | Provision of procurement RFPs and RFBs by business plus other information on how to do business with government | Service completion forms to be completed by businesses | Online purchase by businesses of government data such as census or GIS data, maps |
| **B2G (Business to Government)** | Business provides government online information on goods and services available to agencies through vendor/procurement sites aggregated together | Businesses register as vendors using interactive transactions | Business sells government goods online from vendor "mall" set up to capture economies of scale |

*Table 2. Selected Internet activities from the Pew Internet and American Life Project Survey (Pew Internet and American Life Project, 2004)*

| Internet Activity | Percent of Those with Internet Access Who Do Each Activity | Month and Year of Survey |
|---|---|---|
| Research a product or service before buying it | 78 | February 2004 |
| Look for information from a government Web site | 66 | August 2003 |
| Buy a product | 65 | February 2004 |
| Buy or make a reservation for travel | 55 | May-June 2004 |
| Bank online | 34 | June 2004 |
| Participate in an online auction | 23 | February 2004 |
| Buy or sell stocks, bonds, or mutual funds | 12 | February 2004 |
| Buy groceries online | 12 | March-May 2003 |
| Make a donation to a charity online | 7 | December 2004 |
| Play lottery or gamble online | 4 | March-May 2003 |

*Table 3. Selected government e-commerce activities from the Pew Internet and American Life Project, "Rise of the E-Citizen"Pew Internet and American Life Project (2002)*

| Internet Activity | Percent of Those Who Use Government Web Sites Who Have Ever Done Each Activity |
|---|---|
| *Information* | |
| Get tourism and recreational information | 77 |
| Do research for work or school | 70 |
| Find out what services a government agency provides | 63 |
| Seek information about a public policy or issue of interest to you | 62 |
| Get advice or information about a health or safety issue | 49 |
| Get information about potential business opportunities relevant to you or your place of employment | 34 |
| Get information about elections such as where to vote | 22 |
| Get information that helped you decide how to vote in an election | 21 |
| Get information about a lottery | 21 |
| *Transactions* | |
| File your taxes | 16 |
| Renew a driver's license or auto registration | 12 |
| Renew a professional license | 7 |
| Get a fishing, hunting or other recreational license | 4 |
| Pay a fine | 2 |

Internet and American Life Project have confirmed, many more users now use the Internet to look for information from a government Web site (66 %) and roughly the same number are now using the Web for e-commerce applications (see Table 2) (Pew Internet and American Life Project, 2004). Table 2 illustrates how often those with access to the Internet engage in e-commerce or government-related activities. Table 3 illustrates the fact that most users still use the Internet to search for information from government agency Web sites rather than make an

e-commerce transaction. The Pew Internet and American Life Project found that 16% of government Web site users used the Internet to file their taxes, 12% of government Web site users used these sites to register or renew their car registrations, 7% renewed a professional license, only 4% got a fishing, hunting, or other recreational license and even fewer—only 2%—used it to pay a fine (Pew Internet and American Life Project, 2002). These rates increase with experience with the Internet and with income levels (Pew Internet and American Life—Project, 2002). Far more citizens evidently trust and use government Web sites to get tourism and recreation information (77%) than to get information about the lottery (21 %).

## BASICS OF SUCCESSFUL E-COMMERCE APPLICATIONS

Several elements are necessary for successful e-commerce applications, including those utilized by government. The electronic storefront provides an interface seen by users while the "backend" is where applications like databases reside:

- **The Agency Portal Complete with User-Friendly Interface:** Government agencies must provide an interface that users can navigate and successfully utilize on their own. Typically called the storefront, the user-friendliness of this interface is crucial for the public sector, as many who use public applications could lack experience with computers, the Internet, or both.
- **The Ability to Acquire and Store Information:** Government agencies, like private sector companies, must be able to digitize and manage information about goods available, effectively and efficiently. For e-commerce applications, this means being able to manage the items for sale, orders, and customer information. This is accomplished through database-based catalogs and other database applications.
- **Shopping Cart:** Government agencies typically also utilize the concept, if not the actual software, of the shopping cart. This software application is a virtual space where goods to be purchased are accumulated until checkout.
- **Search and Discovery Engines:** Not only must agencies be able to manage their information in large databases, but citizens must also be able to access and find the information that they need. Therefore, effective search engines are crucial for e-commerce sites and are typically part of e-commerce software suites.
- **Electronic Payment Capability:** Secure systems must be available to allow citizens to pay for services and goods and provide a vehicle for citizen confidence in those systems. Beyond secure credit card systems, digital cash systems are being developed to ensure that money can be transferred smoothly and effortlessly between parties with a high degree of security. These capabilities are also typically part of e-commerce merchant server software.
- **Provisions for Secure Systems:** Confidentiality, authentication of identity, and integrity of transactions. Important requirements for any online transaction include that transactions remain confidential, that all parties be able to verify the identity of all other parties, and that no one else is able to interfere with those transactions. This means that some cryptographic system or a vehicle like digital signatures must be utilized.
- **Connectivity:** All systems need to be accessible and must contain adequate bandwidth to handle the transfer of large amounts of information and communication.
- **Legal and Policy Context:** The entire policy universe surrounding e-commerce is continually evolving and changing. Some of the issues being debated in state legislatures and in Congress are digital signatures, privacy, intellectual property, and Internet taxation. The result of these legislative decisions will have an enormous influence upon e-commerce applications in both the public and private sectors in the near future.
- **Agency Back-End:** The agency back-end activities are also important for the success of a governmental e-commerce application. These activities include inventory management, accounting and finance, delivery mechanisms, and customer service activities that would exist without e-commerce but must be even more efficient since e-commerce is moving the agency towards 24/7/365 operation and citizen service.

For simple implementations, agencies could purchase e-commerce merchant server software to implement their system, which would typically include the user interface or portal, database-based catalog system, a search application and shopping cart with payment capacity. These features entail the front-end of the e-commerce application and are often provided by outside vendors or ASPs (application service providers). Today's (2005) e-commerce models are established within a Web services environment of distributed applications and several different Web protocols—SOAP (simple object access protocol), WSDL (Web Services Description Language),

and UDDI (universal description, discovery, and integration) (Elsas, 2003).

As e-commerce continues to develop, one of the most critical issues for the public sector to resolve is to establish a common e-commerce architecture so that applications can be interoperable, scalable, and, ultimately, useful for the agency and citizens (Oscar, 2001).

## TYPES OF E-COMMERCE MODELS AND APPLICATIONS FOR GOVERNMENT

Several different types of e-commerce models are being implemented in the public sector today.

### Simple Financial Transactions/Classic Shopping Cart Model

The first of these models are the simple financial transactions that are the most common e-commerce sites found on the World Wide Web today. These straightforward transactions allow consumers to access goods from vendors' sites at their own convenience—24/7/365. For simple financial transactions, most sites utilize a classic shopping cart model to store and then move to checkout.

Government agencies do not engage in as many straightforward financial transactions as does the private sector but there are applications which are well-known and are comparable to private sector activities. These include:

- The purchase of goods like stamps or Amtrak reservations from quasi-public agencies in straight-forward transactions that operate exactly like those in the private sector.
- The purchase of birth or death certificate, another important financial transaction in which citizens interact with their governments.
- Online fee, permit, and license payments are one of the most frequently used public sector e-commerce services. Many states currently offer the capacity to purchase hunting and fishing licenses as well as many types of professional licenses.
- A more specific type of license payment and renewal are drivers' license and vehicle registration renewals. Many states currently offer the capacity to renew drivers' licenses and vehicle registration as well as pay parking and traffic citations online.
- Many states have now developed and implemented online tax submission applications where citizens pay fees to submit their tax returns online.
- Finally, many jurisdictions and agencies offer the ability to purchase maps, data, or other "products" produced by the public sector. Census or statistical data is but one example that is either now offered free for download or is available for charge online.

### Portal Sites/Aggregators

In important public procurement efforts, gateway sites or portals have been developed to bring together numerous vendors and retailing opportunities at one site. The goal is to provide one site to which users can go to obtain everything they need and want in order to capture economics of scale and efficiency for agencies. They are based on sell-side one-to-many architectural models in which vendors provide information and the opportunity to purchase goods from their Web sites or independent portal sites with buyers and sellers integrated together (Moon, 2002). These procurement efforts, often run by ASPs, are important e-commerce activities since they utilize the Internet to facilitate B2G transactions. Each vendor's catalog is available for search for merchandise selection, also creating convenience opportunities for government procurement agents.

There are several major procurement projects in the public sector involving vendor aggregator sites. Projects like the U.S. Department of Defense's Emall and the Multi-State Emall project, which once allowed Massachusetts, Idaho, New York, Texas and Utah to participate together in procurement efforts, are collections of sites brought together with a common database and user interface (Stowers, 2001). These e-commerce applications have already proven their enormous potential for dollar savings and productivity improvements for public sector agencies working together. At one time, Massachusetts reported savings of from $52 to $108 per procurement transaction and a 72% reduction in time spent on managing the procurement function (Moon, 2002, p. 28).

### Online Auctions

Online auction or reverse auction sites provide more and more governments the opportunity to interact and bargain with others interested in buying and selling. Auctions operate on the eBay model with many buyers competing for the same goods; governments now often utilize these models to sell surplus or confiscated goods. Along with reverse auction sites, these sites have diffused throughout government agencies. Reverse auctions occur when government agencies identify the goods they want to purchase and vendors bid to supply them. There is evidence that both have saved money for government agencies.

Wyld (2004) has identified several important cases of successful online auctions or reverse auctions and makes the case that this implementation of e-commerce technology is an important new resource for effective and efficient asset management and developing new sources of revenues. Some jurisdictions have successfully sold surplus goods on eBay while the U.S. Defense Department has created a partnership with GovLiquidation.com to get rid of its surplus goods and make money doing it. Bid4Assets is another online private sector site that specializes in the auctioning of tax-forfeited properties. Many law enforcement agencies are also getting involved with online auctions in order to dispose of seized, lost, or forfeited property and goods. The potential for growth in this area is enormous.

### Online Premium Service Areas

Finally, many state governments (examples are Virginia and Georgia) have established password-protected premium services areas that provide services, information, and e-commerce activities—for a fee transacted online. Typically, these sites allow access to protected databases and other information, such as state corporation databases and access to drivers license records which are useful to those in some professions but not to everyone.

## ISSUES AND FUTURE TRENDS

An essential difference between public and private sector e-commerce is that governments serve only their own citizens—a limited number—and a limited geographic area, not a potentially world wide market. Except when jurisdictions are large enough (states or the federal government), this makes any e-commerce efforts far less efficient than for private sector firms. It also makes it more difficult to earn benefits over a broader scale and scope of customers and does not allow smaller jurisdictions to take advantage of economics of scale and positive externalities. Governments obviously also have limits to what can be sold online; most e-commerce applications are found in the limited areas where funds do exchange hands—taxes, licenses and permits, and procurement.

Governments have additional constraints that are confined to the public sector and make e-commerce and e-government efforts infinitely more challenging. These include the absolute need for privacy and confidentiality of client information, their need to be accountable to their citizenry, their duty to provide access to all (not just those with discretionary income), and their duty to provide public rather than private goods. Governments are also more likely to be providing services rather than goods and are therefore less likely to have goods available for e-commerce opportunities.

Because of these restrictions and challenges, governments have moved more slowly towards e-commerce than the private sector and e-commerce transactions are more likely to be found on the largest public sector Web sites like those found for federal agencies, states, and large cities. However, in a very short period of time, many federal agencies, states and cities have developed some extremely innovative applications that provide very useful services to the public.

The potential in some of these innovative areas of e-commerce is great. It is clear that e-commerce in the public sector will grow along with the growth of e-government itself and with e-commerce—although more slowly than e-commerce growth in the private sector. However, the potential for auctions and reverse auctions and other procurement applications is quite exciting (Moon, 2002; Wyld, 2004). In addition, with mobile government (m-government) also beginning to expand, potential e-commerce applications exist for wireless applications as well (Moon, 2004)—the newly emerging field of m-commerce (mobile commerce).

## CONCLUSION

There is an exciting future ahead in e-government and e-commerce, fueled by technology and our imagination. Government processes can be improved and e-commerce can assist in that process. E-government and e-commerce will not replace face-to-face government, but it can definitely enhance it. There are many challenges ahead for e-government and the e-commerce applications that will more and more often fuel those efforts. A careful examination of potential applications, viewed within an agency's own mission and goals, and an examination of the experiences of other agencies' experiences and lessons learned (such as those presented here) will help to enhance the chances of eventual success.

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## KEY TERMS

**Application Service Provider (ASP):** A separate party that manages software-based services for customers. Governments often utilize ASPs to provide e-commerce capabilities.

**Auction or English Auction:** An auction or English auction is the traditional one where customers bid at the lowest price possible and, as demand increases, the price increases also, with bidders anonymously bidding against one another.

**Digital Cash System:** A system that lets users transfer funds back and forth over the Internet and operates like cash or credit cards in face to face transactions. These facilitate e-commerce transactions online.

**Digital Signature:** A digital signature is an encrypted code sent along with Internet messages that uniquely and securely identifies the sender. Since the identity of the

sender can be established, the digital signature enables e-commerce transactions to occur securely.

**Reverse Auction:** Operates the opposite. Suppliers are the ones who bid, after the buyer establishes the auction to receive goods. The suppliers bid down against one another in order to be able to provide the service or goods.

**SOAP:** Stands for simple object access protocol. An XML-based message protocol assists in Web service requests by structuring the communication of data between systems.

**UDDI:** Universal description, discovery, and integration. Dynamic online directory that lists online Web services available on the Web.

**WSDL:** Web Services Description Language, an XML based language describing Web services available in transactions between users.

**XML:** Extensible Markup Language is a Web-based markup language used to tag, or identify, the data used in Web services.

# Applications of Geographical Information System in E-Government

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## INTRODUCTION

Geographical information system (GIS) is one kind of information system that handles spatial data. It is difficult to give one definitive definition about GIS (Heywood, Cornelius, & Carver, 2002; Maguire, Goodchild, & Rhind, 2001). This variety of definitions can be explained by the fact that any definition of GIS will depend on who is giving it, and their background and viewpoint (Pinkles, 2002). The complete definition of GIS is selected here as: "a set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world for a particular set of purposes"(Burrough, 1986, p. 6). As an important part of e-government, is that it has functions of cartography, manages spatial data and spatial analysis.

## BACKGROUND: THE ROLE OF GIS IN E-GOVERNMENT

All types of data are needed in e-government, among which spatial data are perhaps the most important information, reflecting the distribution rules of spatial entities (e.g., property boundaries, roads, etc.). Therefore, e-government cannot do without GIS, and therefore, the management of e-government cannot be successful without analyzing spatial information. With the advantage of handling spatial data, GIS can provide many services concerning spatial analysis, such as, geographical location information, location-based services, route tracing, and the analysis of spatial structures. This can be especially valuable when incorporating social and economic attribute data.

### Functionality of GIS in E-Government

There is a wide range of functions for data analysis available in most GIS packages. According to the top-down hierarchical classification of the major types of functions that characterize GIS, there are ten major categories to define the functions of GIS: capture, transfer, validate and edit, store and structure, restructure, generalize, transform, query, analysis, and present (Dangermond, 2001; Maguire & Dangermond, 2001). In any GIS project, not all of the GIS functions or even all of the major categories need be employed. Generally, with the functions like measurements, attribute queries, buffering, map overlay, spatial interpolation, analysis of surfaces, and analysis of networks, GIS can provide mapping, spatial data management, and many other functions for various managing in public sector.

For example:

- GIS could handle and provide relative maps. Since GIS provide spatial information with maps, it can make the necessary information much clearer and obvious at first glance.
- GIS can collect, handle, store and manage spatial data. Managers can obtain more complex spatial information for making decisions through query functions of the system.
- Spatial analysis function of GIS can be used in simulating and analyzing (creating what if scenarios) of the stored spatial data. With GIS software, various description programs for spatial processes are provided as decision-making support system for management.

### Applications of GIS in E-Government

GIS can play a role in all aspects of spatial information management. In governmental management, GIS application becomes more and more intensive. Some cases are shown next to illustrate applications of GIS in governmental management.

- **Regional (or Urban) Planning—Both General and Physical Ones:** By combining graphic and property information effectively, GIS can provide immediate

and bidirectional data operation. This can provide services such as inputting map data, editing topographic map, setting up attribute data and querying planning information. With the proper system, both general urban planning and physical plans can be created, as well as comparing and simulating the different results of the planning. Meanwhile, GIS can provide assistance via decision-making support tools for selecting land blocks, examining and approving architecture licenses, evaluating demolition and relocation projects. Most importantly, the planning programs can be described by maps.

- **Land Management—Managing Land Resources, Land Record, Land Classification, and land Using:** All the land management process can be fulfilled by operating spatial data stored in GIS. Generally, GIS provide tools such as data inputting, querying land block alteration, analyzing land quality, and automatically measuring land areas for the end users. When doing land management, GIS can also be integrated with office automation (OA) system into an integrated land management information system, which involves many subsystems such as data handling, windows office, and cartography, and so forth. With the system, the users can query the distribution of land resources, alter the record of stakeholders, and make land use plans in the network.
- **Municipal Facilities Management—Managing Pipelines of Water, Electricity, Gas, and so forth:** By combining pipeline databases of municipal facilities, customer location information and property, GIS can provide graphic displaying and query functions for managers and inspectors; by using network analysis model and information about valves and switches of municipal pipeline network, GIS can provide inspection data and emergent repairing programs for work process handling, detect field construction, and analyze the areas where there are, or have been failures or that are prone to failure in the pipelines.
- **Traffic Management—Managing Vehicles and Roadways:** Constructing city traffic information system with GIS, the system can query and analyze the traffic conditions through spatial and attributes data. At the same time, the system can be connected with other equipment, such as road sign controllers, vehicle information systems and global position systems (GPS), etc. In this way, close loop control system is created to manage traffic information, roadways situations, and vehicles effectively.
- **Hazard Monitoring and Controlling—Emergency Management:** A large variety of data elements involved in the assessment of risk and emergency management can be collected by GIS. Once a database of potential hazards has been set up using GIS tools, specific hazards or emergency situations can be displayed by query and other spatial analysis functions of GIS. The system can also help to make special assessments for emergency preparedness by being integrated with social-economic and traffic databases (and other data), assisting in making the decisions for response, and for the process of recovery.
- **Real Estate Management—Managing Housing and Property:** By using GIS, we can manage data of district boundaries, street networks, municipal facilities, architecture, and the various types of public facilities, as well as the characteristics of private properties in order to make good housing policies. For example, providing more housing opportunities for poor people, etc. GIS has very rich functions such as editing, developing overlays and creating complex displays from disparate data. As a result, property information, housing age, housing prices and surrounding infrastructure information can be queried using GIS tools. In addition, the spatial analysis of building locations or property alterations can be done by setting up many kinds of analytical models.

## KEY ISSUES OF GIS APPLICATION IN E-GOVERNMENT

GIS applications will meet various issues in different governmental sectors. Because the governmental roles are multi-sectored and complex, the system has to manage the different data formats, and operate in various environments in order to meet data sharing and exchange requirements between different sources. Therefore, interoperability of spatial databases, the unification of multi-department application systems, and integration of GIS into management information systems (MIS) and other non-spatial systems are critical issues in GIS application.

### Interoperability of Spatial Database

Managing spatial data is the key issue of GIS application. Many kinds of GIS software have been employed over time and some remain as legacy systems. In some cases, software was independently developed. There are lots of differences among these various GIS software platforms, especially because of various data formats. As a result, some data might be lost when it is used with software it wasn't designed for. Hence, data sharing between GIS

software can become difficult. In order to resolve the data sharing problems as above, those managing data should adopt standards, and if possible, have common, shared data store in a database that is designed to accommodate spatial data. The objective is to have data stored in one place, available to everyone that needs it.

### Unifying Various Departments

Governmental management is a vertical and horizontal networked system, which involves multiple levels and departments. In the historical periods of application development, some information systems were built uniquely for different departments. Many of these systems would not work together making communication and collaboration between different departments difficult. When communication and collaboration exists among different departments (systems working together), the sharing of spatial data has played a significant role in constructing of e-government. For example, modern civil traffic commanding system involves city planning, traffic management and environmental departments. All these systems have to work together and be used cooperatively. How to construct such synthesized set of applications is a critical problem in the digital city. The first issue is to set up multi-departmental information system based on spatial data and GIS technology, with data standards and hopefully, common spatial data storage.

### Integration of GIS with MIS and Other Non-Spatial Systems

GIS is one part of e-government. Effective management could not be done without integrating GIS with MIS, OA, a multimedia image processing system, and a communication and image processing system. At present, the lack of a common interface and transparent data access can become the bottleneck of e-government, GIS will play more important role in governmental management system, as the integration problems are resolved.

## MANAGING DATA FOR GIS APPLICATION

Data is the core of GIS. The expense for data can account for more than 80% of the entire system cost, and data needs to be maintained and updated for the life of the system (Chen, 2004). The success of the system is closely related to database architecture and construction. Data segmentation (grouping data relative to users' needs and required access) is developed from administrative segmentation and from different administrative units. The issues of GIS database architecture and construction are listed as follows.

### Unifying Standard of Database Construction

All existing and legacy GIS software may have their own data formats and data structure standards. In many systems, it is impossible to read and use the data directly from other GIS software without translating data formats and structures. Therefore, data formats and structure standardization to enable data sharing, is a key problem, which should be addressed in the process of GIS construction and development to insure the ability to share of data.

### Integration of Databases

The data sources of GIS come from widely different methods of collection, from different time periods, different regions, different departments and different systems, etc. The level of precision, data formats and quality of each set of data also may be quite different. How to organize such data and allow them be shared is a difficult and important job. In order to resolve these problems, data integration must be given the highest priority when designing and constructing an enterprise-wide GIS, using shared data by organizing all existing data, creating standard contents, scales, precisions, and coordinate systems. The benefits are divergent departments and end users, all working with the same information, using the same data standards, the same data precision, and the same data quality, making the management of the system easier and more uniform across the entire organization.

## CONSTRUCTION OF LOCAL GOVERNMENTAL GIS

A local government using a common GIS platform is an important part and phase of an e-government information system.

### Characteristics of the Governmental GIS platform

A governmental GIS platform should be a cooperating GIS based on a Web environment. It is logically unified (central access via the Web), but physically dispersed. The government is the organizer, creator, and user of the GIS platform. The objectives of the technology and data of a government GIS platform are to meet the planning

and managing needs, using governmental and other related spatial information.

The objectives of a governmental GIS platform require that:

- The planning, design and constructing must accommodate existing Web and office platforms
- Different application systems can be set up separately, yet always with a view to eventual integration
- The system needs to be continuingly updated and enhanced. Therefore, the initial system design must look toward the future and accommodate future anticipated requirements

As Governmental GIS is especially valuable when used with urban emergency systems, the initial design should consider being integrated with the various emergency support systems. For example, police, fire, traffic, hazard preparedness, public health, and so forth, so that from the onset, a unified emergency management system can be designed and created.

## Principles of the Platform Solution

- To construct governmental GIS platform for inputting data and making digital maps
- To redefine system functions, including personnel, organization, user rights, map layers, attribute fields, data quality, and so forth.
- To integrate databases seamlessly, setting up a simple interface using real time information, and make the platform into a real time multimedia data display
- To design dynamic and flexible structures in order to satisfy governmental leaders, official members and the public
- To combine distributed application system structure and component structure together (Zhang, 2004)

## System Functions of the Platform

As a platform of governmental management, the system should have more adequate attribute data (from across departments), easy to use queries besides the basic functions of spatial analysis. The main functional areas as follows:

- **Basic Map Maintenance:** This function includes map viewing controls, layer maintenance, map maintenance tools, cartography, saving, printing, and so forth.
- **Signin:** With this function, the user can mark related sites or buildings on map layers within their allocated access rights and input related data.
- **Roaming, Dragging, and Zooming:** For example, the user can index useful information by dragging, zooming, and roaming around the map.
- **Querying and Displaying:** The desired spatial and attribute data can be conveniently obtained, by the user, through the robust graphic functions of GIS. As a result, combined queries for maps, graphs and data can be obtained. For example, the location map can be obtained when the user inputs an address, post-code, unit name, or any other attribute data contained within the system. In the same manner, the surrounding areas' information can also be queried, such as points of interest, hotels, businesses restaurants, shopping malls, hospitals and schools, and so forth.
- **Data Collecting Based on OA:** Data is the lifeblood of a system. Database architecture and design is integral in system construction. Because the existing data is dispersed, may be out-of-date, and come from different sources and formats, it makes the system harder to construct. Therefore, standards and quality criteria of data should be defined from the onset.
- **Doing Statistic and Analysis with the Attribute Data:** If a user creates a histogram using certain data, or identifies certain information such as population density and educational degree, etc., with specific colors, as in a thematic representation, these separate analyses can be displayed in different layers.
- **Releasing Map Information:** Weather forecast, pollution monitoring, municipal infrastructure constructing, development important events and traffic conditions can be mapped and distributed via GIS00

## Technological Features of the Platform

Governmental management platform needs to be compatible with all types of data and systems. Therefore, the technological characteristics are listed as follows:

- The system should support at least 100 users accessing the system at the same time.
- Managing spatial data with a relational database should have spatial data and non-spatial data integrated in the same database.
- The application of GIS controls and components can provide GIS functionality within non-GIS applications.

- The system should support all kinds of attribute data, such as population, economic growth and pollution data. It should also allow for attributes defined by users themselves.
- The system should integrate multimedia data, support graphics and other information, such as characters, pictures, voices, and images, and so forth.

## THE IMPACT OF GIS TECHNOLOGY DEVELOPMENT IN THE APPLICATION OF E-GOVERNMENT—FUTURE TRENDS

From a technological development point of view, Web-GIS, and mobile GIS are the most advanced GIS technologies to date. More and more governmental offices have begun to use GIS, which have created new challenges to GIS technology. New GIS techniques are also appearing in many governmental offices, For example, multiple-dimension data interfusion, three-dimensional information representation (3D CAD), several software techniques that bring maps, data, text and imagery into one system and of course, Web-GIS.

### Web-GIS Technology

Since the internet became popular, the Web browser has been accepted more and more by the publics, because it is a universal client application and used everywhere. Because of the browser as a universal platform, the browser has formed the fundamental tools of Web-GIS. The communication protocols being adopted for Web-GIS are totally different from PC operation system or IP network. The spatial database of Web-GIS is openly designed and combined with standard database technology to form a foundation for Web-GIS.

This technology was naturally incorporated into e-government systems when governmental office automation systems were linked with the Internet.

### Development of Mobile GIS

Mobile GIS plays an important role in an overall GIS system. Terminal devices such as wireless application protocol (WAP) telephone, personal digital assistant (PDA), or even the common telephone can obtain spatial information (Dong, 2004). This makes the possibility of obtaining multi-dimensional spatial information on a mobile device a reality. Mobile GIS is a new field of GIS and should have great market potential. The main application fields in governments for mobile GIS include urban infrastructure management, object-location and resource detection and object tracing, real time data updates from field personnel, and so forth.

### Interfusion of Multiple-Dimension Data

When topology relationships, location relationships and attribute relationships between two or more digital maps are set up, a vast amount of data can be interfused to establish foundations for the management and analysis functions of GIS. These digital maps (from this interfusion) formats are digital line graph, digital raster graph, digital elevation model, digital building model, and digital thematic map, and so forth. (Hao, 2002).

The interfusion technology makes map more convenient to be viewed and operated. It allows non-GIS professionals understand and implement GIS. Importantly, it can take advantage of multiple dimension data to promote planning efficiency and accuracy. The system can be operated in a three-dimension (3D) computer environment, which makes regional (urban) plans much richer and simulate reality.

### Three-Dimension Representation Technology

When 3D information is obtained in the form of vehicle data, mobile data and laser-scanned data, 3D modeling methods can be created using Automatic Computer Assistant Design (AutoCAD, 3D design programs) modeling, 3D image modeling, GIS attribute modeling and laser-scanned modeling. Using these techniques, spatial information can be used within a 3D computer workspace. As a result, information can be configured within a GIS system in order to construct regional (urban) 3D models.

Because it is richer and creates visualizations that are closer to reality, three-dimension representation can be used in monitoring, urban planning and design, and the construction of public 3D viewing platforms.

### Software Integration

Traditional software and new technologies, as well as special purpose software have been integrated with the evolutions and enhancement of the IT technological environment. For example, new techniques such as Web-GIS, 3D-GIS and Component GIS, have all evolved from traditional GIS technology; Multimedia, Work-Flow, and OA software technology has been evolved from traditional MIS; Internet Web technology has been evolved from the traditional local area network. One interesting trend of software integration is the integration of CAD

and GIS and 3D software. There will be more integration of 3D GIS, Web GIS, and VR technology in the future as we move toward more realistic display of data.

With more coordination and integration among governmental departments, there will be more integration of GIS in government. This integration will be mainly done using technologies from MIS, GIS, CAD, OA, Web-GIS, 3D GIS, and virtual reality (VR). Where they will be employed in planning management, real estate management, basic geographic information system, pipe lines management, and urban OA, and so forth.

## CONCLUSION

GIS has strong functionality in the ability to handle spatial data, with which, it can provide a visualization of reality on the computer for the manager. By using GIS software, the manager can view spatial entities and create powerful analysis for decision-making. This makes managing more efficient and effective, because the manager can visualize and harness powerful sources of information.

However, while spatial analysis is the special function of GIS, and is a powerful tool, there is much more to be developed. Both the engineers of GIS and application professionals are trying to develop even more powerful spatial analysis functions for e-government. GIS will become more and more a standard tool in the field of e-government.

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## KEY TERMS

**Attribute Data:** It is one kind of data about the nature of the real-world future that the spatial entity presents in GIS. There are two kinds of data in GIS, which are attribute data and spatial data.

**Buffering:** It is used to identify a zone of interest specified distance around an entity, or set of entities.

**Digital Elevation Model:** Digital elevation model data files are digital representations of cartographic information in a raster form. It consists of a sampled array of elevations for a number of ground positions at regularly spaced intervals.

**Interoperability:** It is the ability of exchanging and sharing data files and programs among

**Location-Based Services(LBS):**LBS is the ability to find the geographical location of the mobile device and provide services based on this location information into the cell network or handset that uses triangulation between the known geographic coordinates of the base stations (with GIS, e.g.) through which the communication takes place.

**Map Overlay:** The ability to take two different thematic map layers of the same area and overlay them one on top of the other to form a new layer.

**Route Tracing:** It is the ability to trace flows of goods, people, services and information through a network in the GIS. Connectivity, the way network links join at network nodes is the key concept in route tracing. Once a directional network has been established, tracing the links downstream or upstream of a point on the network is simply a question of following or going against the flow, respectively.

**Spatial Analysis:** Modeling spatial process with spatial data by identifying the spatial features, representing the concept model and selecting an appropriate spatial data structure.

**Spatial Data:** Data which describe the spatial dimension with mathematical spatial reference.

**Spatial Interpolation:** It is the procedure of estimating the values of properties at un-sampled sites within an area covered by existing observations (Waters, 1999).

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# Applying ICTs in Juridical Decision Making by Government Agencies

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## INTRODUCTION

Electronic government is developing throughout Europe. Increasingly, central, regional, and local governments use ICT applications to perform their tasks. In the 1970s and 1980s, computers were mainly used to perform administrative tasks (including word processing). In the 1990s, *juridical expert systems* were introduced within government organizations: software programs which can solve juridical problems, either without any human interference or with limited human interference, by means of a reasoning mechanism and a "knowledge database" (Groothuis, 2004). Furthermore, government agencies started to use new ICT applications such as the Internet and e-mail to communicate electronically with citizens.

This article examines the juridical aspects of automatic decision making and electronic communication by government agencies in The Netherlands and addresses the following questions:

1. What is the legal framework for automatic decision-making by government agencies in The Netherlands?
2. What is the juridical quality of decisions made by expert systems in practice?
3. What is the legal framework for electronic communication between government agencies and citizens in The Netherlands?
4. To what extent does *electronic government* exist in The Netherlands and what are its prospects for the period 2005-2007?

## AUTOMATIC DECISION MAKING BY GOVERNMENT AGENCIES

Increasingly, government organisations in The Netherlands use expert systems to make juridical decisions in individual cases under the Dutch General Administrative Law Act (*Algemene wet bestuursrecht*). Examples of juridical decisions that are made by expert systems are tax decisions, decisions under the Traffic Law Act (traffic fines), decisions under the General Maintenance Act (maintenance grants), and decisions under the Housing Assistance Act (Bovens, Groothuis, & Van den Hoogen, 2003).

There are two categories of juridical expert systems. Expert systems in the first category support the process of juridical decision making by a civil servant. The decision is taken in "cooperation" between the computer and the civil servant. Expert systems in the second category draft juridical decisions without any human interference. In these cases the decision making process is fully automatic.

### The Legal Framework

To what extent and under which conditions is automatic decision making by government agencies legal? Under Dutch administrative law, there are no specific rules for automatic decision making.[1] Therefore, government agencies are entitled to use expert systems, or other ICT applications, in their decision-making processes if they wish to do so. This does not mean, however, that the use of ICT is not bound by any rules. When government agencies make decisions, the general rules of Dutch administrative law apply. Most of these rules can be found in the *General Administrative Law Act*. Among them are several *general principles of proper administration*: rules which administrative bodies should observe in all their acts. The *justification principle*, for example, holds that an administrative body should give grounds for its decision, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law Act). If a decision is made by an expert system (or another ICT application),

the *justification principle* requires that the reasoning (or logic) behind the automatic decision be explained. This means that the working of the ICT tool has to be transparent.

Besides the *general principles of proper administration* a second set of principles has been developed in Dutch jurisprudence: *general principles of proper use of ICT.* According to some scholars (Bovens, 1999; Franken, 1993) these principles—accessibility, confidentiality, integrity, authenticity, flexibility, and transparency—should be respected when government organizations use ICT. If, for example, a government agency uses an expert system in its decision-making process for residents permits, this system should be accessible for applicants and other citizens (principle of accessibility), function correctly (principle of integrity), and its working should be transparent (principle of transparency).

Finally, the Dutch Privacy Act (*Wet bescherming persoonsgegevens*) contains a specific provision on automatic decision making (article 42). This provision, which applies equally to government and nongovernment organisations and which forms the implementation of an EU directive[2], holds in its first section that:

*every person has the right not to be subject to a decision which produces legal affects concerning him or significantly affects him and which is not based on automatic processing of data intended to evaluate certain personal affects relating to him.*

The second section of this provision gives an exception to this main rule. It states that a person can be subject to a decision as referred to in the first section if—in short—suitable measures are taken to safeguard his legitimate interests, such as allowing him to put his point of view. This provision implies that automatic decision making by government agencies is allowed under the condition that citizens who have a legitimate interest in the decision are given the opportunity to present their views (e.g., in a public hearing).

## Quality of Electronic Decision Making: Two Case Studies

What is the juridical quality of automatic decision making by government agencies in daily practice? In the period 1999 to 2002 I performed empirical research on the quality of automatic decision making by government agencies.[3] In two case studies I examined whether automatic decision making meets the requirements of the applicable statutes and rules of unwritten law. The first case study examined the daily use of an expert system in the field of housing assistance in the Dutch Ministry of Planning. The second case study investigated the daily use of an expert system in the field of general assistance in one Dutch municipality.

In each case study, three steps were taken. First, a *checklist* was developed. Next, this checklist was *applied* to a selection of individual decisions. Third, the *results* of this application were categorised and interpreted.

Each of these individual decisions involved intensive file research. For each of the selected decisions the pertinent file was obtained and studied with respect to the criteria in the checklist. It was determined whether each decision fulfilled all of the requirements in the checklist. Below, the results of the two case studies are summarised.

## Case Study I: An Expert System for Housing Assistance

The first case study examines the daily use of an expert system in the field of housing assistance: *IHS*. This expert system was developed by the Dutch Ministry of Planning in the late 1980s and has "produced" millions of decisions since then. The system is run on a "mainframe", which is connected to a number of personal computers.

Seventy-five percent of all application forms for housing assistance are processed fully automatically by *IHS*: in these cases the decision is made without any interaction by a human being. In the remaining 25% of the cases, a civil servant is involved in some part of the decision-making process. In those cases the decision is made by "cooperation" between the expert system and the civil servant. An *interface* enables communication between the expert system and the civil servant. Via the interface the expert system asks the civil servant to enter specific data. After each question the expert system presents an intermediate conclusion on the computer screen.

In all cases, the reasoning mechanism of *IHS* formulates a decision in the individual case. No human being is involved in the formulation of the text. Each decision is automatically printed out and put into an envelope. No human being reads the decisions before they are sent.

To make correct decisions under the Housing Assistance Act, the Minister of Planning in The Netherlands needs to follow two sets of rules. The first set is the rules from the Housing Assistance Act. The second set consists of the general rules of administrative law, most of which can be found in the General Administrative Law Act. Among these are several *general principles of proper administration*: rules which administrative bod-

*Table 1. Categorisation of the 21 errors detected in the study of 200 decisions made with the support of IHS*

| | Type of quality criteria | | | |
|---|---|---|---|---|
| **Level of support by HIS** | **Content** | **Wording** | **Procedure** | ***Total*** |
| **Full support** | 0 | 16 | 3 | *19* |
| **Incomplete support** | 0 | 0 | 2 | *2* |
| **No support** | 0 | 0 | 0 | *0* |
| ***Total*** | *0* | *16* | *5* | *21* |

ies must observe in all their acts. A small number of general principles of proper administration have not been codified in the General Administrative Law Act; they are considered part of unwritten law[4]. These rules (or criteria) together formed the checklist.

For the purpose of the investigation the criteria contained in the checklist were divided into three subgroups:

1. Criteria with regard to the *content* of the decision;
2. Criteria with regard to the *wording* of the decision;
3. Criteria with regard to the *procedure* of making a decision.

The above checklist was applied to a selection of decisions made with the help of *IHS*. The period of investigation for the case study was 1999 to 2000; the decisions under investigation were made between July 1, 1997 and July 1, 1998. In this time span the Ministry of Planning made 1,031,000 decisions on a first application for a benefit under the Housing Assistance Act. Of those 1,031,000 decisions, 200 decisions were selected randomly and became the object of further investigation.

The investigation of the 200 cases revealed 21 errors which can be divided in the three categories of quality criteria in the checklist. These 21 errors can, however, also be categorised with respect to an important second dimension: level of expert system support, where three categories are distinguished:

1. Tasks for which the expert system offers full support
2. Tasks for which the expert system offers incomplete support
3. Tasks for which the expert system does not offer any support

Thus, the 21 errors detected can be categorised according to the criteria and according to the level of support delivered by the IHS system (Table 1).

As Table 1 shows, in none of the 200 cases was an error made with regard to the *content* of the decision. This result is remarkable. It can be explained by looking at the way *IHS* works. In this expert system, the provisions of the Housing Assistance Act have been translated into algorithms. In these algorithms, as in the Provisions of the Act, the rules for calculating the sum of housing assistance have been laid down. These rules are complicated, but they are all closed norms: there is no space for judgment during the decision-making process. The algorithms clearly prescribe step by step how the sum of housing assistance must be determined. The expert system—an application of ICT—never fails to apply the rules. In each case it applies the same algorithms, without ever making a mistake.

Table 1 further shows that in 16 out of 200 cases an error was made with regard to the *wording* of the decision. In each of these 16 cases, there was a breach of the justification principle, which holds that an administrative body should give grounds for its decision, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law). Decisions on housing assistance are formulated automatically by *IHS*: no human being is involved in the formulation of the grounds for the decision. The errors with regard to the wording of the decisions were caused by the way the expert system works. It produces standard text blocks for standard situations. A few standard text blocks, however, are incomplete: some steps of the reasoning process are left out. Thus, the grounds for the decisions become incomprehensible.

Finally, Table 1 shows that five errors were made with regard to the *procedure* for the decision-making process. In three of these cases, the error was caused by the expert system: it failed to check whether data were correct in situations where the General Administrative Law prescribes that such verification should be performed. In the other two cases, the error was made

*Table 2. Categorisation of the 25 errors detected in the study of 30 decisions made with the support of MR-ABW*

| | Type of quality criteria | | | |
|---|---|---|---|---|
| **Level of support by MR-ABW** | **Content** | **Wording** | **Procedure** | ***Total*** |
| **Full support** | 1 | 0 | 0 | *1* |
| **Incomplete support** | 5 | 11 | 0 | *16* |
| **No support** | 2 | 1 | 5 | *8* |
| ***Total*** | *8* | *12* | *5* | *25* |

by the human factor. In these cases, (typing) mistakes were made when a civil servant entered data from the application form into the expert system. These mistakes, however, did not affect the final outcome of the decision-making process (the calculated sum of housing assistance was correct).

## Case Study II: An Expert System for General Assistance[5]

The second case study investigates the daily use of an expert system in the field of general assistance in one Dutch municipality. This expert system, *MRE-ABW*, was developed by a Dutch software company in the 1990s and is now in daily use in about 20% of the Dutch municipalities. The system, which can be run in a network environment and on a personal computer, contains three parts: (1) a *database*, (2) an *interface*, and (3) *a reasoning mechanism*.

The *database* contains rules from the General Assistance Act, additional local regulations, case law for general assistance, rules from the General Administrative Law Act, and unwritten rules of general administrative law. Thus it offers the user the legal information with which to make decisions under the General Assistance Act.

The *interface* enables communication between the expert system and the user. In most cases the user will be a civil servant working in the social security department of a municipality. Via the interface the expert system questions the user, asking him or her to enter specific data (for example: date of birth and income of the applicant, etc.). After each question the expert system presents an intermediate conclusion on the computer's screen. The system can also generate an advisory report and a draft text for the decision in each individual case.

The *reasoning mechanism* or core of the expert system, is a set of algorithms into which all the steps that the expert system takes to deal with individual cases have been programmed. The reasoning mechanism applies the input data to the rules stored in the database. Thus it formulates intermediate conclusions, which are presented to the user via the interface. After asking a number of questions, the reasoning mechanism formulates a draft advisory report and a draft text of the decision in the individual case and exports both texts via the interface to a word processor, after which the user can either adjust them or print them as is.

In order to make correct decisions under the General Assistance Act, a municipal executive in The Netherlands needs to follow two sets of rules. The first set consists of the rules from the General Assistance Act itself. The second set is made of the general rules of administrative law, as described under case study I. These rules (or criteria) together formed the checklist.

For the purpose of the inquiry these criteria were divided into three subgroups:

1. Tasks for which the expert system offers full support
2. Tasks for which the expert system offers incomplete support
3. Tasks for which the expert system does not offer any support

The above checklist was applied to a selection of decisions made with the help of MR-ABW in one municipality. The period of investigation for the case study was January to December 1999. In this time span the social security department of the municipality in question made 1145 decisions on a first application for a benefit under the General Assistance Act. Of those decisions,

30 were selected randomly and became the object of further investigation.

The investigation of the 30 cases revealed 25 errors with respect to the three categories of quality criteria in the checklist[6]. These 25 errors can also be categorised as to the "level of expert system support", similar to case study I.

Thus, the 25 errors detected can be categorised according to the criteria and according to the level of support delivered by the MR-ABW system (Table 2).

As Table 2 shows, only a single error was made while performing a task for which the expert system offered full support. This error concerned article 43 (m) of the General Assistance Act. According to this provision, part of the work income of parents with children under the age of five may be disregarded (which leads to a higher benefit). The expert system offers full support for the task of interpreting whether a person qualifies for this provision. However, although the person in this case qualified, article 43 (m) was not applied. This was not the result of an error in the expert system. The civil servant probably did not give a correct answer to all the questions of the expert system. Based on wrong input, the system could only conclude that the provision did not apply.

Sixteen errors were made in performance of a task for which the expert system offered incomplete support to the civil servant. In 11 of the 16 cases, the decision did not fulfill the requirements for the wording of the decision. In all these cases, there was a breach of the justification principle, which holds that an administrative body should give grounds for its decisions, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law). In each case, the expert system offered a draft text for the decision, which contained grounds, but this draft text did not meet the requirements of the principle. In some cases the reasons that were given in the draft text were incomplete, with only some of the reasons specified in the decisions. In other cases, a calculation of the assistance allowance was given, but this calculation was incomprehensible, because important steps were missing. The civil servants could have amended the draft text for the decision manually, but they failed to do so.

In 5 of the 16 cases, the decision did not meet the requirements for the content of the decision. These cases all showed the same type of error in the application of article 14(2) of the General Assistance Act. This provision specifies the circumstances that must be taken into account when imposing a sanction upon the person applying for or receiving an allowance. The expert system offers support for the application of this provision, but its support is incomplete. That is, the system offers a draft text for imposing a sanction, but it does not support how the civil servant takes into account the circumstances specified in article 14(2). It appeared that the civil servants skipped the unsupported part of the task: the relevant circumstances were not taken into account.

Eight times an error was made in performing a task for which the expert system did not offer any support to the civil servant. Here the civil servant had to rely on his or her own knowledge. Without the help of the expert system, errors were made in all categories: errors in the content of the decision (two cases), errors in the wording of the decision (one case), and errors in the application of procedural rules (five cases).

To my knowledge this is the first investigation into the extensive use of expert systems in the daily practice of handling a complex juridical task within government organizations[7]. The results of these case studies show the problems that may arise when expert systems are put into practice, as well as their ability to improve the quality of the decision-making process. Expert systems may indeed be useful to improve the quality of decisions, especially when they make complex calculations. More specifically, the use of expert systems can further compliance with the principle of legal equality and the prohibition of arbitrariness. However, the use of expert systems does not guarantee juridically correct decisions. Errors—especially breaches of the justification principle and breaches of the principle of due care—are made if the system offers only limited support to its users. There is a risk that users will rely too much on the expert system and will not use their own knowledge when necessary.

These results underline the need for users of juridical expert systems to be aware of their limitations and to know how to use them. Government agencies that decide to use expert systems should take additional measures to maintain control over the quality of the decisions in fields which are not, or not completely, covered by these systems. Such measures may include:

- analysis of complaints by citizens and case law and, where necessary, adjustment to the expert system or the instructions to the users;
- additional training for the users of the expert systems in order to make them more aware of the risks of too much reliance on the expert system.

## ELECTRONIC COMMUNICATION BETWEEN GOVERNMENT AGENCIES AND CITIZENS

Increasingly, government agencies and citizens communicate with each other by electronic means. Citizens send e-mails to government agencies to apply for permits and grants and to submit objections or appeal against government decisions which affect them. Government agencies, in turn, open Web sites on which citizens can download forms, collect government information, submit applications, and so forth. To what extent and under which conditions is electronic communication between government agencies and citizens legal under Dutch administrative law?

In April 2004 the Dutch parliament adopted the Electronic Administrative Communications Act (*Wet elektronisch bestuurlijk verkeer*). This Act, which entered into force on July 1, 2004, regulates electronic communication in administrative procedures. This law is aimed at removing the legal obstacles for electronic communication between government agencies and citizens[8].

A key issue in this context is the term "in writing". Under Dutch administrative law, several acts are required to be in writing. Applications for individual decisions and objections against those decisions, for example, have to be submitted in writing. How should this term be interpreted in an electronic context: are electronic letters (e-mails) considered in writing? Since the late 1990s—when e-mail and Internet became common means of communication—there has been uncertainty about these issues under Dutch law.

The new Electronic Administrative Communications Act removes this uncertainty. It leaves the term "in writing" as is, and indicates in its explanatory memorandum that this term should be interpreted as "expressing signs on a data carrier". The data carrier can, according to the memorandum, be paper, but also an electronic carrier, such as a computer disk. Thus, the legislator has adopted a wide interpretation of the term "in writing". The requirement that applications for decisions have to be submitted in writing, for example, means that applications can be made by a letter on paper, but also via e-mail. The same applies for the submission of views, objections, and so forth.

The new Act further regulates under which conditions electronic communication between government agencies and citizens is allowed. Two principles are central in this context. The first principle is that electronic communication is allowed if both the government agency and the citizen(s) involved agree to permit it. Citizens are not obliged to communicate electronically with government agencies; on the other hand they have no right to do so if the government agency chooses not to use electronic ways of communication. The second principle is that the electronic message meets requirements of "reliability" and "confidentiality": an electronic message may be sent if the electronic system by which it is sent is sufficiently reliable and confidential, given the nature of the communication.

The Electronic Administrative Communications Act also contains a provision on *electronic signature:* art. 2:16. This article holds that the requirement of "signature" is met by an electronic signature "if the method which is used for authentication is sufficiently reliable, taking into account the nature and the content of the electronic message and the object for which it is used." The provisions on electronic signature in the Dutch Civil Code (art. 15*a*, section 2-6, and art. 15*b* of Book 3) apply to the extent that the nature of the message does not oppose to this. These provisions of the Dutch Civil Code are part of the Dutch Electronic Signature Act which forms the implementation of Directive 1999/93/EC of the European Parliament and the Council of the of 13 December 1999 on a Community framework for electronic signatures.[9]

## PLANS AND PROSPECTS FOR E-GOVERNMENT IN THE NETHERLANDS

### Plans for E-Government: An Overview of the Government Program 2004-2007

In September 2004 the Dutch government published the report "Towards the Electronic Government" (Ministery of the Interior and Kingdom Relations, 2004), in which it presented its policy program for e-government in the period 2004 to 2007. In this program the government has formulated four targets:

1. Companies and citizens should be required to submit certain information to the government only once.
2. There is to be an electronic system which enables all companies and citizens to be uniquely identified for official purposes.
3. In its communication, both internal and external, the government is to use open standards, thus

decreasing reliance on any one supplier or platform.

4. By the year 2007, 65% of all public services (at national, regional, and local authority levels) should be provided via the Internet.

In order to reach these targets the Dutch government has started a number of policy programs since 2004. These include a program to develop an infrastructure for electronic identification and a program for electronic authentication.

The object of the program for electronic identification is to enable all persons to be identified with just one type of document. At present, identification relies on various official documents such as a passport or National Identity Card for those persons registered with local authorities, a *SoFi card* for EU residents, and a *Foreign Citizens Card* for others. All such documents carry a unique number. The introduction of the new electronic identification—a chip card—will enable information to be read from the document electronically. Such information shall include the unique biometric characteristics of the holder. The chip card will enable government agencies to provide a wide range of public electronic services for which unique identification is required.

The object of the program for electronic authentication is that users—government agencies, citizens, and companies—can be certain that information can only be accessed in an authorized manner, and that it is impossible for anyone to assume another person's identity. To reach this goal, the government has started the development of a *Universal Government Access Facility*. This facility will have three layers of security:

1. A high security level, providing an electronic signature as defined and required by art. 2:16 of the Electronic Administrative Communications Act
2. A medium security level, in line with the current tools used for Internet banking and the software certificates (as proposed by the Chambers of Commerce)
3. A basic security level, requiring an identification number and/or password, as currently used by the Tax and Customs Administration

The *Universal Government Access Facility* shall enable government agencies to offer a range of "services" (e.g., maintenance grants, parking licenses, building licences) *online* to citizens and companies, rather than in offices.

The program "Towards the Electronic Government" has not yet been completed: the targets which the Dutch government has set for itself are for 2007. It is too early to estimate whether the goals will actually be reached. At present (2005) both the program for electronic identification and the program for electronic authentication are at an early stage of development. Plans have been presented and pilot projects have started in several municipalities.[10] At a national level, however, there is not yet an electronic identification or a means of electronic authentification for electronic transactions between government agencies and citizens.

## Prospects for E-Government: Challenges and Opportunities

What are the prospects for e-government in The Netherlands in the near future? We can conclude from the above paragraphs that the legal infrastructure for e-government is ready but the practical infrastructure is not yet. The new *Electronic Administrative Communications Act* regulates under which conditions electronic communication between government agencies and citizens is allowed. The new Act also contains a provision on "electronic signature", clarifying under which conditions an electronic signature can be qualified as a signature under the Dutch Administrative Law Act. However, in practice there is not yet a national infrastructure for electronic identification and authentication. It will last a few more years until each citizen in The Netherlands has his or her own electronic identification card which can be used in contacts with all government organizations. It will also last a few more years until there will be a national infrastructure for electronic authentication—available for electronic transactions with all local, regional, and national public organizations.

If the goal of a national electronic identification card and a national infrastructure for electronic authentication is reached in 2007, the prospects for e-government in The Netherlands in the period thereafter are positive. Empirical research in 2003 already showed that there is a demand for electronic government services among citizens and companies (Bovens et al., 2003; Groothuis, 2004). All municipalities in The Netherlands and nearly all other government agencies have Web sites. Already now citizens use e-mail to apply for grants and licenses and to submit objections against decisions by government citizens. Many municipalities and other government organisations develop plans for electronic transactions and have started implementing them at a small scale

in daily practice. The main challenge for the Dutch government in the period until 2007 will be to develop and implement a national—harmonized—infrastructure for electronic identification and authentication.

## CONCLUSION

The use of ICT by government agencies offers, from a legal point, both challenges and opportunities. A first opportunity is that ICT facilitates communication between government agencies and citizens. Citizens now have a new choice in their contacts with government agencies: they can communicate not only orally (in an office) or in writing (on paper) but also via e-mail and other new forms of electronic communication. Government agencies, in turn, can use Internet and other ICT applications to actively involve citizens in the process of developing new policies, prepare decisions, and so forth. This means that the interests and opinions of citizens can be better taken into account. An important condition for electronic communication between government agencies and citizens is that it meets requirements of reliability and confidentiality. These requirements have been laid down in the new Dutch *Electronic Administrative Communications Act*, which entered into force on July 1, 2004. To meet these requirements the Dutch government has started to develop a national infrastructure for electronic identification and authentication.

A second opportunity is the use of juridical expert systems in the process of decision making by government agencies. Investigations into the extensive use of expert systems by government agencies indicate that expert systems can indeed be useful to improve the quality of decisions, especially when they make complex calculations.

However, expert systems do not guarantee juridically correct decisions. Empirical research in The Netherlands has shown that errors are especially made if the system offers only limited support to its users.

There is a risk that users will rely too much on the expert system and will not use their own knowledge when necessary. These results underline the need for users of juridical expert systems to be aware of their limitations and to know how to use them. Government agencies that decide to use expert systems should take additional measures to maintain control over the quality of the decisions in fields which are not, or not completely, covered by these systems.

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## KEY TERMS

**Algorithm:** A series of instructions for the performance of tasks and their sequence.

**Automatic Decision Making:** Decision making based on automatic processing of data.

**Electronic Signature (under Dutch Law):** An electronic method for authentication which is sufficiently reliable, taking into account the nature and the content of the electronic message and the object for which it is used.

**General Principles of Proper Use of ICT:** Principles which should be respected when government agencies use ICT (e.g., principles of accessibility, confidentiality, transparency).

**In Writing (under Dutch Law):** Expressing signs on a data carrier (paper or an electronic carrier).

**Juridical Expert Systems:** Software programs which can solve juridical problems, either without any human interference or with limited human interference, by means of a reasoning mechanism and a knowledge database.

**Universal Government Access Facility:** A means of authentication which enables government agencies to offer a range of services (e.g., maintenance grants, parking licenses, building licences) on line to citizens and companies.

## ENDNOTES

1 There are two provisions of European Union law on automatic decision making, the articles 12 and 15 of Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data: Official Journal 23/11/1995, L 281/31. These provisions, and their implementation into Dutch law, are addressed in this article.

2 Art. 15 and 12 of Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data: Official Journal 23/11/1995, L 281/31. An analysis of these provisions of the directive is made in Bygrave (2001).

3 This empirical research was part of my PhD studies into the legal aspects of electronic decision making by government agencies (Groothuis, 2004).

4 These rules of unwritten law, such as the principle of legal equality, were developed in the Dutch case law and jurisprudence.

5 This overview, which is part of my PhD studies, was earlier published in Groothuis and Svensson (2000).

6 Each of the 25 errors, as well as the overall results of the case study, were discussed with the manager of the social security department of the municipality. The manager agreed with the finding that there had been errors in these cases.

[7] Experiments with juridical expert systems in laboratorium settings were described in Nieuwenhuis (1989), De Bakker and Wassink (1991), and De Vey Mestdagh (1997).

[8] An analysis of the new Act can be found in Groothuis and Voermans (2001). A comparative law study on electronic communication and its impact on administrative law can be found in Prins, Eifert, Girot, Groothuis, and Voermans (2002).

[9] Official Journal L 013, 19/01/2000 p. 0012-0020.

[10] Examples are the municipalities of Dordrecht <www.dordrecht.nl> and Enschede <www.enschede.nl>.

# An Assessment of the Open Government Web Site in Mongolia



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## INTRODUCTION

The open government Web site was initiated and developed under the direct guidance and support of the prime minister of Mongolia in 2002. The project was initially supported by USAID (United States Agency for International Development) and The Asia Foundation from 2004. The main purpose of the Web site is to strengthen the linkage between the private sector and government and to facilitate public contribution of opinions to state policies and laws. The Web site has four major sections namely: legislation (draft laws, Parliament agenda, and links to laws); discussion (forum, online conference, questions, and answers); links; and search engine. Moreover, there is an opportunity to subscribe to the Open Government newsletter.

This article describes the current status of the open-government Web site in Mongolia, its strengths and weaknesses and provides a framework for future action in order to improve service delivery

## BACKGROUND

The concept of e-government was introduced to Mongolia in 2001 (Enkhargal & Ariunaa, 2001) when government organizations were furnished with computers, networks and necessary equipment and some locally and internationally developed software. At the workshop on public administration reform, one of the sessions was dedicated to the use of technology for delivering government services. The concepts of what is e-government and e-governance were introduced, the former described as the opportunity for government to provide government information to citizens and the latter described as providing government services online to the public. (Heeks, 2001). Although there are different definitions of e-government and e-governance, there were no major debates or discussions held on their definite distinctions.

Information and communications technology (ICT) in the government of Mongolia refers mainly to the use of hardware, the internal organizational network setting, use of different software and applications, and access to the Internet. Apart from the physical hardware, the important issue is how to utilize investments in ICT to better serve citizens of the country. There are a number of ways to do that: (1) by developing an office management system; (2) by setting up Web sites and providing information; (3) by providing opportunities for strengthening linkages between the private sector and government; and (4) by facilitating communication with the public on matters of policies and laws.

The open-government Web site of Mongolia was referred to by the *World public sector report 2003* of the United Nations as one of the examples of "listening to citizens." (UNDP, 2003, p. 174). Since its launch in 2003, the open-government Web site has been highly promoted and publicized. It is seen as the best means to bring the voices and concerns of the public and the private sector to the government. The front page of the Web site has welcoming remarks by the prime minister of Mongolia, who says that "24/7 (meaning the Web site is accessible 24 hours a day and 7 days a week) running Web site will enable YOU to express your opinions to the government with transparency and to co-rule the country with us." The prime minister also assures citizens that the government will take into consideration their "valuable, comments, initiatives, and support." (Open Government, 2005.)

Currently, there have been over 124,270 visitors to the open government Web site which translates to over 100 visitors per day (Open Government, 2005). The forum discussions are highly popular and account for most of the visitors to the Web site. The rules of discussions require that users should "express their opinions freely, without using insulting or offensive language and must respect others' opinions" (Open Government, 2005). The Web site administrator has the right to delete comments when rules are violated and he or she is "not responsible

for the content of people's comments" (Open Government, 2005).

The open government Web site has links to Web sites of 17 governmental organizations, 10 media, eight international organizations, seven NGOs, 11 IT companies, and four others, including reference to CNN and BBC. In addition, there is a "Frequently Asked Questions" (FAQ) section, which provides preset answers to questions commonly asked by visitors. The prime minister visits the Web site regularly; and also gets comments in abbreviated format every two weeks. Visitors to the Web site are not expected to write directly to the prime minister, but the Web site performs the function of the messenger.

## STRENGTHS OF OPEN GOVERNMENT WEB SITE

The open government Web site of Mongolia has a number of strengths namely that:

1. The prime minister has been personally involved in supporting and promoting the Web site. Without his leadership role in developing the Web site content and without his encouragement to government officials to regularly visit the Web site and provide their input, the open government Web site would have remained static.
2. It publishes draft laws for public discussion on the Web site, which provides citizens with the opportunity to make their input to the draft laws.
3. The regular visitations of government officials at the open-government Web site provide opportunities for them to give quick feedback on issues and concerns raised by the public.
4. Every two weeks, the prime minister and ministers are informed of the progress made at the open-government Web site. Issues raised on the government Web site are discussed at the meeting and given recommendations for follow-up by line ministries, agencies and other governmental organizations.

## WEAKNESSES OF OPEN GOVERNMENT WEB SITE

The Mongolia open government Web site also has a number of weaknesses, such as:

1. The local area networks at the ministries and agencies are not operational in the true sense of LANs. This in effect hampers individual government officials in providing information and services from their desks.
2. The process of getting input on laws and regulations from the public is complex. Such inputs are received by the ministry/agency representative on duty, passed on to his or her boss, then further to the prime minister before it is affected into the draft law or regulation after it has been discussed.
3. Apart from the discussion forum, which is the most visited part of the Web site, the other parts are not regularly maintained.
4. There is little information or feedback to the public about which of the suggestions were considered for integration into draft laws and regulations.

Despite its strengths and weaknesses, the open-government Web site has had an impact on citizens and businesses. They are realizing that there is a new way of reaching the government, using computers and networks; that the government is willing to open up to public through this Web site and that the citizens and businesses could contribute to draft laws—a new tendency in the relationship between citizen and government. Although, it is difficult to say how much businesses use this Web site, the information available on the site seems important to them, such as the linkages to the Web sites of government organizations and the opportunity to contribute to the draft laws. Still, many challenges lay ahead. This includes the opportunity for accessing this Web site not only from the capital city, but also from different parts of Mongolia as well as by representatives of different groups of society, especially those who do not have computers at home or have no access to Internet (or cannot afford to pay for this kind of services). Mongolia is a largely dispersed country with few citizens (1.5 million square kilometres and 2.6 million population) (Statistics for Mongolia, 2001). Around 1 million people live in Ulaanbaatar and the remaining 1.5 million are widespread throughout the huge territory of Mongolia with limited access to information and technology. How to reach these one and half million people outside the capital is one of the great challenges for open government in Mongolia. Although Mongolia is considered a highly educated country with a high rate of literacy (97% by 2001 figures) (Human Development report of Mongolia, 2001), the infrastructure still is an issue for people from the rural part of Mongolia preventing them from having

access to government and directly to the prime minister himself. There is a telecommunications backbone reaching out to major settlements—aimag and soum centers, but there are few soum centers that have access to the Internet and its services. Fewer opportunities are open for herders who lead the old nomadic lifestyle of moving from one place to another following pastureland for their livestock, and consequently are cut off from information services and resources. It is important to open up opportunities for both rural and urban parts of population of Mongolia and initiate activities to reduce the increasing digital divide in Mongolia. Even in the capital city itself, there are differences between people living in the centre and on the outskirts of Ulaanbaatar. The more things are done, the more problems need to be resolved. However, it is important that the government is not giving up and is looking for ways and means to overcome these challenges.

## RECENT E-GOVERNMENT INITIATIVES

The government of Mongolia has recently given a higher priority to the ICT sector by establishing the Information and Communications Technology Authority (ICTA) in November, 2004. Over only 6 months, the ICTA has initiated the "E-Mongolia" program (www.icta.gov.mn) to foster development of ICTs in Mongolia. As part of this program, the Internet Service Providers joined their efforts in the establishment of the Mongolian Internet Service Provider Association (MISPA) (www.mispa.mn), through which they started negotiations with satellite providers to reduce costs and increase bandwidths for the whole of Mongolia. This gives the ISPs much more power to negotiate better prices than when they leased lines separately from the satellite providers. This is expected to result in the reduction of the costs for Internet access for individual citizens and organizations. Moreover, a "Computers for all" program is being developed which would enable citizens to purchase high-quality computers for the cheap price of 250USD. The computer companies established their own association, so called Mongolian Association for Computerization (MASCO). Within framework of e-government program, the government organizations started not only providing information through their Web site, but also started governmental services online. Among those leading organizations is the Mongolian Taxation Authority (MTA), which has a Web site with information about taxes in Mongolia and downloadable taxation forms, which were required to buy from taxation agents at the submission of tax forms (www.mta.mn). With this Web site, the private companies can download around 40 taxation forms and bring filled out forms to the taxation office. This is one step towards e-governance development in Mongolia.

These and other initiatives provide increased incentives for government to provide information and services online to citizens and businesses. This, in turn, would evolve into the next developmental phase for the open government Web site, when it will provide services to enable citizens to perform online transactions. Although the people in urban areas seem to have access to a broad variety of information services and resources, the people in rural parts of Mongolia still lack this opportunity. Because of the insufficient telecommunications infrastructure, the people in the rural parts of Mongolia will likely not be able to take advantage of these new developments in the near future.

## FUTURE TRENDS

There are a number of suggestions that would improve the operations of open government Web site which are discussed next.

1. **Improving the Content of the Web Site:** Despite the popularity of the open government Web site, the content of the Web site needs to be enriched further. For example the Web site should have information on all government officials including—their positions, issues they handle, room numbers, phone numbers, email addresses, and Web sites if available. This would make the government more open and transparent, providing grounds for two-way communications.
2. **Increasing the Visibility of the Web Site to the Public:** One of the main points of having government Web site is to make it more visible to citizens, the private sector, NGOs and others. Over the past year, the promotional activity of the project seems to have been reduced. The people who know about open government Web site regularly visit it and provide their inputs on the site. However, for new comers, the situation may be difficult. There are linkages to the open government Web site from other organizations, such as MIDAS/MONITA (Mongolian Information Development Association/Mongolian Information Technology Association) NGO, Open Society Forum NGO, the Governmental portal site, and at sites of international organizations. Awareness should be created among

potential users to use all available means of communication—Internet, Web, newspaper, television, radio, and so forth.

3. **Enhancing Information and Services Provided to Citizens:** If the Web site made provision on how inputs from citizens were integrated or taken to improve draft laws and regulations, this would provide excellent grounds for people to visit this Web site and become active participants in government affairs. Currently, there is no information provided on whose inputs were taken or not. Moreover, it is essential to keep the content of the Web site up-to-date, and also regularly monitor and evaluate Web site visits. For example, it is important to know which content is visited more often. In addition, regular surveys of visitors and their comments on the Web site, itself, not just the discussions, should be undertaken.
4. **Strengthen further the Linkage between Private Sector and Government:** The private sector is driven by profit-making and rarely moved by social missions. If the Web site had information, for example, on government procurements at least from Cabinet Secretariat, this would attract the private sector to this Web site. For example information on private companies providing ICT services to government, such as hardware maintenance, solving technical problems, providing consultancy services, supplying hardware, software and applications would enhance private sector participation in government. This information would be necessary to service procurement.
5. **Linking Open Government Web Site with Actual Operation of the Government:** Within the framework of public sector reform, there is a need for linking up public reform initiatives with ICT. The decision needs to be done at the level of senior government officials to achieve the goal of providing adequate public services to citizens, to make government open, transparent and accountable.
6. **Establishing Public Access Points to the Web Site:** Considering that not everybody has computers or access to Internet, the setting up of public access points would at some extent decrease digital divide in the country and thus would enable broader participation of the citizens in the decision making process.

## CONCLUSION

Although the open-government Web site has some weaknesses, the fact that (1) it is visited by over 100 people per day; (2) the forum discussions are continuing for days on different issues and (3) government is paying great attention to it—prove that the Web site has more opportunities in the future. These include linking citizens directly with individual government officials, increasing the awareness of this site among a broader audience, and establishing public access points for citizens. More can be done, but the fact, that the government initiated, opened up and uses this Web site as a main gateway between government and citizens and businesses and plans to develop it further, shows the importance of these first steps and the necessity for further action. Businesses and citizens from their side should support, use and benefit from this initiative. One thing is definite, that the open-government Web site has had an important impact on citizens and businesses in their relationship with government.

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## KEY TERMS

**Accountability:** Quality of being accountable, responsible. The ability to call state officials, public employees, or private actors to account, requiring that they be answerable for their policies, actions, and use of funds. Access to information and analysis about the performance of services and policies builds pressure for accountability.

**Forum:** An information interchange regarding a specific topic or product that is hosted on an Internet newsgroup, online service, or BBS. It can include the latest news on the subject, a conferencing capability for questions and answers by participants as well as files for downloading fixes, demos and other related material.

**Government of Mongolia Web Site:** A single point of access to major programs, services, and organizations of the Government of Mongolia. Its address is www.pmis.gov.mn

**Hardware:** Machinery and equipment (CPU, disks, tapes, modem, cables, etc.). In operation, a computer is both hardware and software. One is useless without the other. The hardware design specifies the commands it can follow, and the instructions tell it what to do.

**Internet:** The largest network in the world. It is made up of more than 100 million computers in more than 100 countries covering commercial, academic and government endeavors. Originally developed for the U.S. military, the Internet became widely used for academic and commercial research. Users had access to unpublished data and journals on a variety of subjects. Today, the "Net" has become commercialized into a worldwide information highway, providing data and commentary on every subject and product on earth.

**Online Conference:** Conference organized online through Internet. It runs on a real-time schedule, however it is not tied into specific geographical location, does not require physical presence of the participants, and provides opportunities for interaction with other participants, presenters, keynote speakers as well as presentations, forums and discussions held during online conference are available at any time virtually.

**Public Access Points:** Points of access to government information and services by citizens without computers and no access to Internet. Usually those access points are established in aimags' centers of Mongolia to enable citizens raise their voices and concerns to the government through ICT and actively participate in government policy development.

**Transparency:** Clarity and openness regarding activities and relationships.

# Assisting Users Seeking Medical Information through Government Portals

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## INTRODUCTION

There has been an explosion in the number of different types of portals in the last decade, and at the same time there has been a lot of confusion with them, especially in relation to the enormous number of portals and their differences from Web sites or Web-pages. This coincides with increased use by consumers seeking medical information on the Internet, and with the important role played by medical portals for evidence based medicine.

This article explores current portal technology available from an evaluation of market leaders in the industry and identifies important functional components that are necessary in building an intelligent portal to assist users seeking information on the Internet.

The emphasis will be on government to consumer portals (G2C) and uses two reputable government portals Betterhealth and Healthinsite as examples to discuss issues involved with those.

## BACKGROUND: INCREASED USE OF PORTALS FOR SEEKING MEDICAL INFORMATION

Reliance on portals for medical information is high, and recent statistics show that this trend is growing. At the same time medical information is widely dispersed and information retrieval is inadequate (Shepard, Zitner, & Watters, 2000). There is an urgent need to develop portals that help users to retrieve quality information.

The National Health Medicine Advisory Council reported that better health outcomes are predicted when users are better informed, suggesting the need for digitization of health services (Bodenheimer, Lorig, Holman, & Grumbach, 2002; Kennedy, 2002; National Health Information Management Advisory Council, 2001). However this is yet to be confirmed, as Internet content has not yet proven to be satisfactory. There is a lot of concern about the materials found on the Internet (Ciolek, 1997, Moon, 2005).

Modern portals are built with the aim of better catering for the different needs of users. Portal technology is improving and features such as knowledge management, content management, and search engines, along with effective Web site design, help users to find information more effectively, and yet portals remain ineffective in information retrieval (Clarke & Flaherty, 2003; Elias & Ghaziri, 2004; Quirk, 2001; Rao, 2001). An effective evaluation tool to assess the validity and effectiveness of the portal is quintessential in assisting both users and portal builders.

## PORTALS

Portal terminology has been loosely used in the industry and the term "portal" means different things to different people. Some argue that the word "portal" should be used as an adjective—"portal framework," "portal structure," and "portal architecture"—rather than as a noun as it is commonly used (Roth, 2003). Others are confused by the difference between a Web-page or Web site and a portal. The same confusion is applied to health portals vs. medical portals. The following sections seek to clarify these terms.

### Definition of Portals

For the purpose of this research, the working definition of a portal is an Internet-based information system providing uniform access to different sources of information in an enterprise and maintaining dynamic links to information resources (Moon & Burstein,

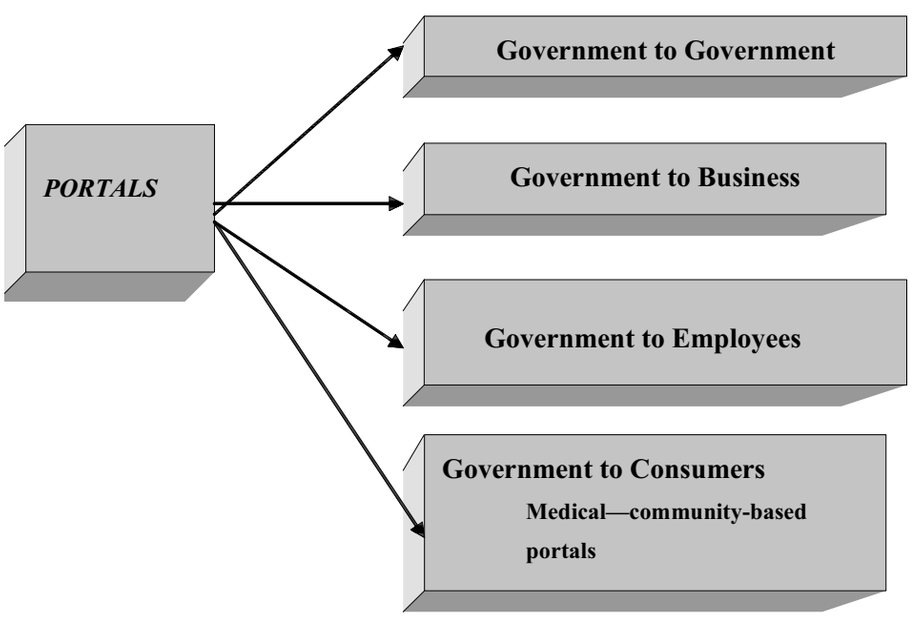
2004). A portal supports communication within the enterprise, and connects people with information and applications they need for performing tasks. Unlike a conventional Web site, portals should support both push (subscription) and pull (search) functions in assisting users to gain access to essential contextual information (Probst, Raub, & Romhardt, 2002; Shepard et al., 2000).

## Portals vs. Web sites

The word "portal" is often confused with Web sites. The difference between Web sites and portals is that the former are static and the latter are dynamic. Portals are Web-based, have dynamic links to the information resources, effective information and document managers and connect people with information. A portal is dynamic, can have personalisation features built into it and has the ability to bring together "business professionals involved in their area of interests" (Hazra, 2002, p. 623). A portal is a mechanism to deliver content, using a Web browser. It runs on an application server, and can integrate with knowledge management and workflow. It must unify a large range of applications, services and information flows.

A Web site is static, and is a collection of Web pages relating to a given subject, including and beginning with the home page; for example, a company Web site. A portal is often confused with a Web server where many different Web sites can be stored on a single machine. Companies generally have many Web sites that are stored by commercial Web servers

*Figure 1. Government portal market segment diagram (Adapted from Collins, 2003; Clarke and Flaherty, 2003; Shepard et al. 2000)*



in different locations, sometimes worldwide.

For the purposes of this chapter, any Web sites which have at least one of these listed features is referred to as a "portal."

## CLASSIFICATION OF PORTALS AND FUNCTIONALITIES

There was an explosion in the number of different portals in the late 1990s. A great multitude of terms are used to describe different types of portals. Some examples are: EIP (enterprise information portal), corporate portal, community portal, employee portal, business intelligence portal, horizontal portal, vertical portal, public portal and private portal, to name just a few. These names are dependent on who the stakeholders are (Collins, 2003; Portals Community, 2004).

A government portals can be categorized broadly into four types depending on the stakeholders (government to government, government to business, government to employees, and government to consumers).

- **G2G (Government to Government):** Supports work flow between government sectors and assisting and collaborating work, not accessible to consumers
- **G2B (Government to Business):** Supports business flow, activities, suppliers, and partners for distribution and supply chain management
- **G2E (Government to Employee):** Supports the access and availability of personalised information to employees
- **G2C (Government to Consumer):** Supports ordering, service, support, and billing for customers

All of the portals in Figure 1 fall in to the function of the following three types:

- **Knowledge Portal:** Has the ability to combine information, but provides no commercial transaction
- **Decision-Based Portal:** Collection of information from a wide variety of sources, which can be structured or unstructured
- **Process-Based Portal:** Changing focus to delivery, user-centric, collecting information to be distributed to future processes such as business to consumers (B2C) or business to business (B2B), where transactions are involved

Recent development has been on process-based portals, those that promise to deliver information based on user needs. All of the previously mentioned portals are rapidly evolving to support changes in the information needs of customers, businesses, suppliers, and individuals. The names of portals vary according to services and the users they serve (Wege, 2002).

### Portal Server Technology

Portals integrate diverse interactions: access to information, applications, and people. The infrastructure, which is a connection between hardware and software, is critical for the deployment of a portal. The portal server technology items needed are:

- **Hosting Service Provider:** The hosting service provider can be internal (the IT department within the organization), or external (an application service provider (ASP)) or an off-site hosting services vendor. Hosting service providers are responsible for maintaining the portal services. The tasks involve systems management and site administration
- **Platforms:** Several types of platforms have evolved. The most pervasive platform is the Operating System, especially Microsoft Windows OS, Windows 2000, and Windows NT. Others include Macintosh (for client layer), Unix, and its variants (Sun Solaris, Linux, IBM AIX, IBM OS/390) for the servers also. Some traditional main frames are OS/390, OS/400, etc
- **Interoperability:** Interoperability is crucial to the success of the portal. A typical portal would integrate several Web based applications (Microsoft and Sun architecture), XML, and database applications as well as desktop applications (word processors and spread sheets).

*Table 1. Medical portals comparison*

| Australian Medical Portal | Search Engine | Spell Check | Sounds Like Index | Parsing | Ontology | *Personalization* | Thesaurus | Dec. Facilitis |
|---|---|---|---|---|---|---|---|---|
| BetterHealth Channel | Google | X | X | X | X | X | X | X |
| Health*Insite* | Yahoo | X | X | X | X | Yes | Yes | X |
| Rural Health | X | X | X | X | X | X | X | X |
| Health*InfoNet* | Yes | X | X | X | X | X | X | X |
| HealthConnect | Yes | X | X | X | X | X | X | X |
| Medicine Australia (MedAu) | Yes | X | X | X | X | X | X | x |
| HealthNetwork | Yes/ selective | X | X | X | X | X | X | X |

*X = No, absence of the feature*
*Yes = Presence*

A good portal would consolidate all these applications into a single organized desktop

- **Personalization:** Portal personalization can be made at different levels. An individual can have personal settings; a group of people sharing the same function can have group settings. An organization can choose its own settings. These features allow the portal to be customized according to needs
- **Single Sign-On (SSO):** Signing on only once to get access to all the facilities portals offer is crucial. This is a significant time saving in logging on to different sites, and a significant reduction in training and also time saving for administrators in re-issuing passwords for those who have forgotten them (Collins, 2003, p. 39; Portals Community, 2002, p. 12; Wege, 2002).

## Functional Components of Medical Portals

Portals should provide wide functionality to allow users to find information, and to manage, categorize, and use applications. They should ensure that the features needed by employees in the organization are met. The implementation of functionalities will vary depending on the nature of the business. Some of the functionalities that are available and can be implemented in medical portals are as follows:

- **Browse/Navigate Documents:** Allowing users to search for and locate information manually by navigating a directory structure
- **Collaboration:** An important aspect of a portal and a powerful tool. It includes instant messages such as "chat," document sharing, video conferencing, virtual conferencing, and discussion forums
- **Content Management:** A process of approving, authoring, delivering, maintaining, and publishing content integrated with or accessed from a portal or other Web site. This can be implemented as a separate component with a common database accessible through the portal
- **Directory:** A directory within the portal's enterprise taxonomy. It is a collection of data structured into a hierarchy of categories

*Table 2. Evaluation of portal vendors on intelligence features*

| Vendors | CM | KM | Navigation and Search | Personalization | Community Definition | AI |
|---|---|---|---|---|---|---|
| ArtTechnology Group | • | • | • | • | • | • |
| Autonomy | • | • | • | • | • | • |
| BEA systems | • | • | • | • | • | |
| BroadVision | • | • | • | • | • | |
| Citrix | • | • | • | • | • | |
| Computer Associates | • | • | • | • | • | |
| Corechange | • | • | • | • | • | |
| Epicentric | • | | • | • | • | |
| IBM | • | • | • | • | • | |
| Oracle | • | • | • | • | • | |
| PeopleSoft | • | • | • | • | • | |
| Plumtree | • | • | • | • | • | |
| SAP | • | • | • | • | • | |
| Sun Microsystems | • | • | • | • | • | |
| Sybase | • | • | • | • | • | |
| TIBCO | • | • | • | • | • | |
| Vignette | • | • | • | • | • | |
| WebMethods | • | • | • | • | • | |

- **Document Management:** Similar to content management but dealing mainly with control and management of an enterprise's documents. It involves managing electronic files including scanned images of pictures and documents
- **Personalization:** Portal personalization can be made at different levels. An individual can have a personal setting; a group of people sharing the same function can have group settings. An organization can set up its own setting. This feature allows a portal to be customized according to needs
- **Search Engine:** The ability to search is the fundamental implementation of a portal. It allows users to browse the content, retrieve information on a content basis, and link to other repositories for information
- **Subscribe/What's New?:** Allows users to register an interest in a particular aspect of the portal. Portals then notify the user when any changes in the content occur
- **Taxonomy:** A classification scheme to organize information. Additional functionalities, such as metadata added to taxonomy, could help to organize documents into different categories that could make the information easy to browse, search, or navigate ideally.
- **Online Community:** Opportunity for users with similar interests to discuss their medical conditions and experiences. This could range from sharing experiences of treatment to discussing medical conditions and alternative medicine (Collins, 2003; Millen, 2000; Moon & Burstein, 2004; Tushkar, 2000).

## THE IMPORTANCE OF INTELLIGENT MEDICAL PORTALS

The term "intelligent medical portal" refers to a Web gateway environment that allows users with varied medical interests and diversified backgrounds to access medical resources and information to support their decision-making processes, which often involve critical medical problems.

Current medical portals do not provide for people with different educational backgrounds, age, ethnicity, location (urban or rural), and stages of disease.

For example, there is no specific information for a 63-year-old female with early breast cancer or for a 35-year-old mother experiencing advanced breast cancer living in a rural area. The hyperlinks regarding breast cancer seem to employ a "one-size-fits-all" approach (McKemmish, Burstein, Manaszewicz, & Fisher, 2002).

In the case of breast cancer, a third of sufferers in Australia live rurally. For them the quality of information is absolutely critical, often life-threatening (Manaszewicz, Fisher, Williamson, & McKemmish, 2002). The development of an intelligent portal is to some extent a response to this problem. A major concern is that there are no real safeguards and standards concerning the "quality, precision, trustworthiness, currency, and authorship of this information" (Ciolek, 1997, p. 5).

How can a portal be made to behave intelligently so that users can easily gain access to vastly distributed medical information? McKemmish et al. (2002) suggests an intelligent portal "will improve the structure and manage the quantity of information presented" (p. 5). Indeed an intelligent portal should provide information that is high-quality, relevant, and adequate. It should provide for the needs of users by helping them to solve issues that are often critical to life. With the use of intelligent portal technology, combining knowledge management issues of personalization and decision support, the needs of Internet users of medical portals could be improved.

## Intelligence Features

Previous research has established intelligence features that are available technically as follows (Moon & Burstein, 2004):

- Search engine
- Spell checking
- Sounds-like index
- Parsing
- Ontology
- Personalization
- Thesaurus

As medical jargon, treatment and drug names are often very difficult to remember and spell, it seems that it is essential to implement the available technology previously mentioned as much as possible to assist users in their search for medical information.

## Australian Medical Portals

Despite the surge of interest and importance of the Internet for providing users with medical information, users were dissatisfied with the results. The following table illustrates the results of intelligence features against seven Australian medical portals.

All the portals had search engines. In general, most of them lacked in providing any form of intelligence. Health*Insite* is the only portal that provided "personalization" and a "Thesaurus."

## Evaluation of Portal Vendors on Intelligence Features

For the purpose of this research, it was important to look for what was currently available on the market in terms of functionalities for medical portals that make them more intelligent.

To do this it was necessary to explore various vendors of portal software and find the functionality available as well as to compare vendor's views with users' views to check the validity of vendor's claims. Though the technology and the concept of the portal have been around for more than 10 years, the idea of implementing portal solutions as a whole package is still fairly new. Most of the portal solutions that are available are developed to solve commercial problems, and are expensive.

After the evaluation of leading providers of portal software, eighteen high-profile providers were chosen for the analysis of intelligence features.

All the leading portal software packages provided most of the intelligence features. Only two vendors, Autonomy and ATG, provided AI, in particular artificial neural networks, for their search. ATG is in partnership with Autonomy for their search engine.

## FUTURE RESEARCH

The results of this study confirm wide use of Government portals in searching for medical information. However, the study indicates that Australian medical portals have a limited intelligence features and are not meeting the needs of their users despite of the available technology. Further research should be undertaken in:

- **Intelligent Medical Portals:** How intelligence features can be effective in implementing medical portals.
- **Implementing Intelligent Agents:** Implementing intelligent agents such as "digital secretary," which acts as personal secretary, or "digital sister-in-law," which helps users with movie suggestions, make portals smarter (Jafari & Sheehan, 2003).
- **User Profiles:** Better identification of common profiles of information usage and matching these with correct content by employing the best available technology to improve user acceptance of portals.

## CONCLUSION

The research reports that current Australian medical portals are not meeting their users' needs. The research sought to discover the ways to improve the portals technology to assist the users in their search for medical information. From the literature review and analysts reports the definition of portals and of the many different types of portals are identified.

The analysis of portal vendors amongst market leaders, the technical functionality available for portals was identified. All the portal vendors had most of the listed intelligent features with the exception of artificial intelligence (AI). Autonomy was the only vendor that provided with AI that of Artificial neural network.

An intelligent medical portal is one way of meeting consumers' needs. Understanding human search behaviour can help to improve the technology if this understanding is integrated into interface design. Available portal technology such as ANN and fuzzy logic can help to improve information retrieval. Further incorporating intelligence features and portal functionalities such as CM, DM and KM can add value to the service and thereby increase the effectiveness of portals.

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## KEY TERMS

**Content Management:** A process of approving, authoring, delivering, maintaining, and publishing content integrated within or accessed from a portal or other Web site. It can be implemented as a separate component with a common database accessible through the portal.

**Health Portals:** Health portals on the other hand, are broad; they cover a very wide range of health and medical topics, anything relating to health (e.g., shampoo products, cosmetics, diets, medicine, and alternative therapy. This research is concerned with the narrower cencept of medical portals.

**Intelligent Medical Portal:** Refers to a Web gateway environment that allows users with varied medical interests and diversified backgrounds to access medical resources and information to support their decision-making processes, which often involve critical medical problems.

**Knowledge Management:** This can be seen as a mechanism for capturing "know-how" and "know-why" in a knowledge repository.

**Medical Portals:** Medical portals provide information such as causes of diseases, medications, treatments, alternative therapies and lists of consultants. Medical portals can be either general or specific. General medical portals provide general medical information, for example Better*Health* or Health*Insite*. Disease-specific portals provide information specific to a particular disease (e.g., cancer portal, breast cancer portal).

**Portal:** In Latin, the word *porta* means a gate or entrance. A portal can be defined as a gateway to information (Golier Inc., 1980). It is Web-based and connects a set of commonly used information or services via a link from a single Web page (Clarke and Flaherty, 2003; Elias and Ghaziri, 2004; Notess, 2002; O'Leary, 1999; Rao, 2001).

# Automated Content-Management Systems



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## INTRODUCTION

The World Wide Web quickly evolved as a valuable resource for organizations to provide information and services to users. Much initial development of Web pages was done haphazardly. This resulted in many information gaps and inconsistencies between pages. Departments with more available time created more and better-designed Web pages even when they were no more important. Personnel who created Web pages would move to other jobs and their pages would become obsolete, but no one would bother to fix them. Two copies of the same information on the Web would become inconsistent when only one was updated, leaving the public wondering which was correct. Solutions were needed. We survey here the principal solution methods that have been developed.

## BACKGROUND

"Content management" has recently become a popular term encompassing ways to manage Web pages, online databases, and print documents more consistently (Boiko, 2002; Hackos, 2002). "Content" means an organization's information assets. Since Web pages have become the primary means for organizations to publish information today, the primary focus of content management is on Web pages (Goodwin & Vidgen, 2002; Proctor, Kim-Phuong, Najjar, Vaughan, & Salvendy, 2003). Content management is "Web page bureaucracy," imposing a set of policies and rules for creating pages, implementing them, updating them, and reusing their content for new purposes. Bureaucracy is not necessarily bad, since no one wants an organization (especially a government one) that is inconsistent or incompetent. Governments are required by law to provide certain services, and a bureaucracy of Web pages can assure that Web services are delivered properly and fairly. So although content management is not unique to digital government, it is an especially important and essential technology for digital government. But content management, like any bureaucratic innovation, does stifle some creativity, impose additional restrictions, and add time to create and use pages.

A variety of commercial products are available for content management, ranging from standalone applications for Web page authoring to comprehensive systems that control every aspect of an organization's Web pages. The term "content-management software" can refer to any of these. Costs range from free (for open-source software) to millions of dollars, and systems are rarely compatible with one another. So an organization must do a careful study before embarking on content management. Useful case studies of development of systems are available (Dudek & Wieczorek, 2003; Kunkelmann & Brunelli, 2002; Lerner, 2000; Weitzman et al., 2002).

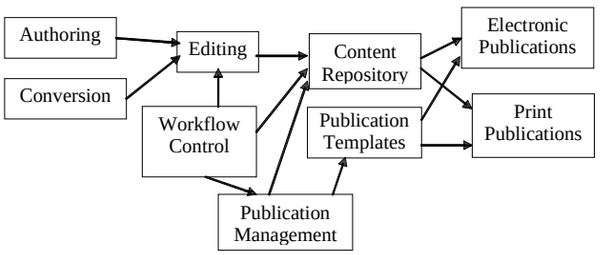
## TASKS OF A CONTENT-MANAGEMENT SYSTEM

Typically content management is divided into collection, management, and publication (Boiko, 2002):

- Collection facilities obtain information ("content") with such things as Web authoring tools, specialized word-processing software, media managers and editors, and format conversion.
- Management facilities control the approval mechanisms and information flow of content. Most systems store content for pages in a database or "repository" along with metadata describing the form of the content. Management facilities ensure that checking and approval is done by specified people before content is made public, and they can also test content errors and track different versions of content.
- Publication facilities convert content into polished public presentations in Web pages, print documents, or various forms of media. They provide templates for selecting information and providing a consistent appearance. Publication management also includes efficient management of Web sites.

We now discuss in more detail the tasks of a content-management system (see Figure 1). Collection facilities comprise authoring, conversion, and editing; management facilities comprise workflow control and the content

*Figure 1. Outline of the content management process*




repository; and publication facilities comprise publication management, publication templates, electronic publications, and print publications.

## Authoring

General-purpose text editors can create content for content-management systems, but editors specifically designed for Web authoring like Microsoft Front Page and Macromedia Dreamweaver are often better, and the more-structured editors accompanying comprehensive content-management systems are even better. An organization can mandate starting templates for its Web pages with such tools, into which the content must be fitted and apportioned. A template can specify the types of information allowed and/or required on a page, general information about the page, and its layout.

Templates require "metadata" information about each chunk of content to manage it properly. This can include (among other things):

- Author
- Who needs to approve it
- The software that created it
- When it was created
- When it was last revised
- When it becomes effective
- When it becomes obsolete
- When update-reminder messages should be sent
- To whom update-reminder messages should be sent
- Fonts needed to display it (if they matter)
- How the text should be aligned and justified (if it matters)
- Links needed to other documents
- Keywords that help describe it
- Classification of the content type

The authoring tool must obtain this information, but it should not need to ask the author for most of it if the tool is designed properly; otherwise, metadata requirements can quickly develop into a serious point of contention between authors and their organization. Author name, software, and special formatting information can be obtained from defaults set when a user first uses the authoring tool. Creation and revision dates can be obtained from the operating system. Effective and obsoleting dates can default to specified durations or times after the revision date (so for instance, class schedules at a university become effective at the beginning of each quarter and obsolete at the end). Formatting can be specific to the type of content selected by the user before starting. Keywords and content classifications can be obtained from authors via menus, but it can still be burden for them, as it has required many hours by librarians for print publications over the years. It helps to have different keyword menus for different types of content, and to use defaults for types where possible. For instance, all content from the purchasing department can have keywords "purchasing," "acquisition," and "contracts." Keywords can also be guessed from page titles and abstracts, and classification can be estimated by text-analysis methods (Varlamis, Vazirgiannis, & Halkidi, 2004), but this is less accurate.

## Conversion

Much important content of organizations comes from sources other than Web pages. So a content-management system needs tools to convert a variety of documents to the format of the system. This includes such things as converting image files from GIF format to JPEG format, and documents from Word format to PDF format. Audio and video often require conversion since several incompatible formats are currently competing with one another. Conversion also includes formatted editing such as stripping blank lines or rearranging the columns of a table from a text-formatted database. When reusing information from other sources, copyright and usage restrictions may apply, so rights management software (Fetscherin & Schmid, 2003) may be necessary to track this, but this is not common with government content.

Electronic publications can also automatically acquire content from across the Internet. This can be done by specialized programs called "aggregators" and "bots" (Heaton, 2002) but they require programming. For example, an organization's Web page can be programmed to automatically show the latest weather report, news headlines, and boss's pronouncement as acquired from other pages.

XML (Extensible Markup Language) is essential today for organizing chunks of content, and most content-management software uses it. It is a generalization of the Web language HTML that allows for structuring and labeling of arbitrary data. So acquisition of content usu-

ally entails a conversion into XML (Surjanto, Ritter, & Loeser, 2000).

## Editing

After content has been created or acquired, an organization normally sends it to someone for checking of style, appearance, coverage, and consistency with organization policy. Style is traditionally checked by human "copy editors," and involves examination of spelling, grammar, usage, rhetoric, and consistency. Content may also need to be edited to conform to organization policy in matters such as length, technical detail, use of color images, and accessibility to disabled users (W3C, 1999). Editing may also address metadata, since while a good authoring tool can fill in some metadata, authors may not be consistent in such metadata as keywords.

Editing electronic content may also involve segmentation and/or aggregation of content into user-friendly pieces, an issue more important than with traditional print documents. The editor may get many small documents (especially if they are generated automatically) and need to combine them into a larger one, as in collecting information for a phone directory. But also an editor may have a document that is too large and need to partition it into subdocuments. Partitioning is essential in formatting for small handheld devices like personal digital assistants (PDAs), but can be valuable with any Web pages since users get lost easily in large documents when they lack the tactile feel of turning pages.

## Workflow Control

Most automated content management manages the chain of approval necessary to publish. If done right, automation of approval management can significantly increase the productivity of a government organization since often much time is wasted in obtaining approvals. It can also eliminate many tedious manual transfers of files and possible errors in doing so. One needs to define, for each category of document or content, the sequence of people who process it (with substitute people when they are absent), what kind of processing they provide, and what time constraints must be fulfilled ("workflow control"). For instance, instructions for completing a new government form could be drawn up by a technical writer, sent to their supervisor for approval, sent to a copy editor for style and language improvements, sent to a Webmaster who controls the Web site, posted on the test site for debugging, and then moved ("migrated") after a time to the public Web server. As examples of time constraints, a department could specify posting of the current version of its forms catalog every three months, and a review of press releases by on-staff lawyers could be bypassed if they do not complete it within two days.

Workflow control also must include procedures for handling mistakes in publications since they can be costly. So it must be possible to return a Web site or electronic publication to a previous version, what is called "versioning control" (Nguyen, Munson, & Thao, 2004). Mistakes can be reduced by posting content to a staging or test server first (not necessarily on a separate machine from the public server); this is important for testing when content is dynamic or requires special software.

## The Content Repository

Most content-management systems use a database, the "repository," to hold the pieces of content after authoring, conversion, editing, and approvals. This can range from a basic file system to a full database system. In many cases this should be a single centralized database for simplicity, but there are advantages in flexibility and robustness to distributing the information over several sites (Cranor et al, 2003; Luo, Yang, & Tseng, 2002); peer-to-peer methods can even be used to distribute content (Hausheer & Stiller, 2003). Methods for object-oriented databases can be helpful because content usually represents a variety of object types. Media files will need to be stored separately with pointers to them since their sizes can vary so much. The database will also need to support versioning and archiving.

Another benefit of automated content management is the ability to systematically check for inconsistencies like links that become invalid or pages that are moved. So deletion or moving of content in the repository should trigger changes to all content pointing to it. Broken external links can be found automatically by systematic periodic checking.

## Publication Management

Finally, content management creates publications automatically or semi-automatically from the content in the repository including its metadata. Templates can be defined to assure consistent presentation style, including how the information is partitioned into pages and cross-linked. Metadata labeling of content permits creation of a diverse set of documents from the same information, including both print and electronic publications. It can also permit personalization of publications to the user using "cookies" and other forms of user tracking. For instance, the system can remember the type of display device the user had last time, the language they preferred, and the topics in which they were interested (Huang & Tilley, 2001).

The structure of publications is critical to usability so content management needs to address this, using feedback from potential users. This includes the partitions into subdocuments, titles and headings, links between documents (hyperlinks in electronic documents), navigation aids to help users locate themselves in a set of documents, and use of dynamic content. Electronic documents also greatly benefit from good indexes to the content, and keyword-based access using the indexes; although search engines such as Google index sites, an index specific to a site helps users find things faster.

Content management also includes management of the hardware and software that supplies content to users. Caching of frequently-requested information helps response time (Candan, Li, Luo, Hsiung, & Agrawal, 2001). Distributing popular content redundantly across different sites can reduce overloading problems and increase reliability. Management can include automated copyright management. It also can include methods for presenting multimedia data such as choosing the size of an adequate window for playing video over a limited-bandwidth Web connection.

## ACCESS CONTROL FOR SECRECY

All governments have secrets they must protect. Examples include secrets to preserve the privacy of citizens (like tax information), secrets to preserve fairness (like early economic data), secrets to facilitate negotiation (like diplomatic secrets), and secrets to protect public safety (like military secrets). Secrecy requires more powerful content control than that of a content-management system, to control who has access to the content and how it can be used. Secret information must be segregated on separate computers and networks where it cannot be accessed or transferred without tight restrictions. It entails many other security measures, like passwords, encryption, access-control lists, monitoring of systems by intrusion-detection software, monitoring for inadvertent electronic emanations, and control of the physical devices on which secrets reside. Declassification or revealing of secrets is needed on occasion but must be subject to stringent safeguards.

Military and diplomatic organizations have elaborate systems for handling such "classified" information (Landwehr, Heitmeyer, & McLean, 1984). The U.S. military is representative, with four basic levels of Unclassified, Confidential, Secret, and Top Secret. In addition, the levels can have "compartments" which designate a subtopic to which the classification applies, such as a compartment for nuclear secrets. An individual must have a "clearance" for both the level and compartment to access the information. All information must be used in appropriate designated facilities and have its classification printed on it.

## FUTURE TRENDS

Content management is becoming increasingly common to all Web sites of organizations. It will soon be unthinkable for organizations to develop Web sites without it, and governments especially need content management to provide reliable and consistent services to their citizens. The current large number of products and vendors will probably decrease as a few products become popular. Few major innovations in the facilities of content-management systems are likely with the exception of multimedia support, but the systems will become increasingly flexible and increasingly well human-engineered as vendors gain experience with users.

## CONCLUSION

Everyone complains about bureaucracy in government, but some bureaucracy is necessary to provide systematic, consistent, and complete service to citizens. Content-management systems extend bureaucracy to an organization's publications by deriving them systematically from stored electronic data that has been carefully checked through a series of approval steps and then presented in a standardized way. As such, they can increase the speed and reliability of government procedures and reduce workloads by permitting reuse of content for many purposes. But like all bureaucracy, content management risks getting out of control and impeding operations if not managed properly since its complexity can encourage growth of a technocratic elite unresponsive to citizens. To avoid this, it is essential to keep content-management systems as simple as possible and to manage them responsibly for the benefit of citizens.

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## KEY TERMS

**Aggregator:** Software for automatically creating documents by collecting it from a set of designated Internet sites.

**Classified Information:** Secrets (like military capabilities) that a government protects by special access controls (like identification cards and passwords).

**Content:** Any information formatted primarily for display to humans, as opposed to internal data of a computer.

**Content Management:** Policy and software for managing the electronic publications of an organization.

**Metadata:** Any data describing other data, such as size and type information for a media file; essential to management of databases and other information systems.

**Migration:** Copying content from one site to another, as from a test server to a public server when it has been approved for release.

**Repository:** In content management, the database holding the tagged content from which publications are constructed.

**Versioning:** Software to keep track of versions of publications, different either in date or audience, so that when changes are made to parts of the content those changes will appear simultaneously in all the versions with those parts.

**Workflow Control:** Management of who sees and approves content, and in what order, before it can be published.

**XML:** Extensible Markup Language, a general language for structuring information on the Internet for use with the HTTP protocol, an extension of HTML; currently the most important language for flexibly sharing information between computer systems.

# Automatic Generation of Theories of Coordination in Multi-Agent Systems

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## INTRODUCTION

*Coordination* is defined as the process of managing dependencies between activities. Its fundamental components are the allocation of scarce resources and the communication of intermediate results. Coordination theory can be defined as the set of axioms, constructs and analytical techniques used to create a model of dependency management in multi-agent systems (MAS).

*Multi-agent systems* (MAS) represent a significant interest in a variety of disciplines, such as artificial intelligence (and other domains of activity in computer science), political science, international relations, public health, public policy, social welfare, economics, demography, anthropology, communication studies, geography, history, sociology, urban planning, control theory, electrical engineering, military science, and so forth. The present author and his students have worked on several systems in different domains of MAS, such as:

a. **Manmade Technical Systems:** The technical and economic aspects of distributed automated air traffic control; distributed automated control of urban street and highway ramp traffic signals; learning, planning and collaborating robots; distributed control of nationwide manufacturing operations; distributed decision support systems for optimum resource and task allocation over space and time.
b. **Natural Complex Systems:** The behavior of natural organisms, causality and temporal relations, social structures and coordination.
c. **Human Behavior and its Simulation:** Language development and studies of the properties of dictionaries; behavioral studies on reasoning and decision making; information, fact and knowledge retrieval; automatic teaching and evaluation of control operators; social networks, social and cultural anthropology aids; multi-agent systems simulating human societies.

One important concern is how to verify the correctness of the computer representation of MAS and how to optimize their operations. Theories of Coordination (ToC) should satisfy these requirements. However, such are currently ad hoc and amorphous, in that there is no unified model of coordination, though there exist many constructs describing specific phenomena in MAS. With the current advent of large-scale agent-based societies, there is a need for theories that builders can use in designing MAS, instead of being forced to learn from trial and error every time such a society is built. In addition to such design tools, we generate a trouble-shooting tool to diagnose problems with existing deficient systems. We envisage steady feed-back from this component to the user when the MAS malfunctions.

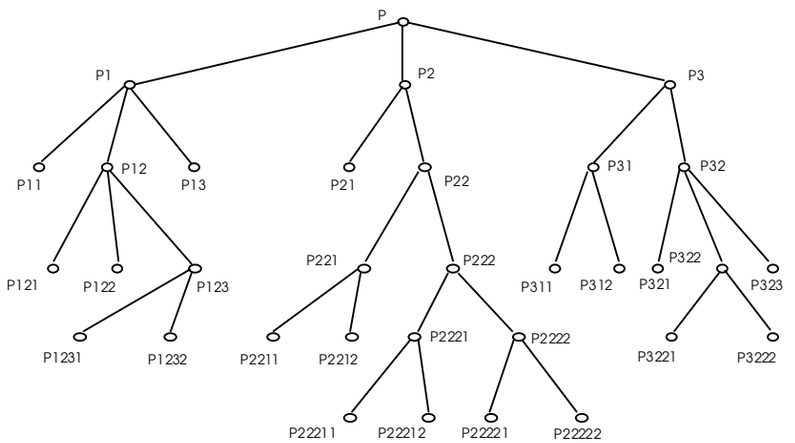
We are creating software tools and formal techniques to be used to analyze and design[1] systems of interacting intelligent agents. The concept is based on our experience gained in many projects, primarily in developing tactical and strategic decision support aids for use in dynamic command and control environments with multiple resources, multiple tasks, multiple sources of information and multiple human and machine decision makers that have different roles and responsibilities and belong to a hierarchy with overlapping jurisdictions. (This was completed during our multi-year collaboration with the U.S. Coast Guard in computerizing their tactical and strategic planning processes.)

## BACKGROUND

Our approach to the above scenarios is to use intelligent agents as aides for human decision-makers, with each agent performing a small number of functions. The complex problem of designing a command and control system for such environments is greatly aided by automated support. A fundamental requirement for such automated support is a framework for modeling coordination in a way that can be used by automated tools. Our ongoing work is intended to satisfy this requirement.

We are adopting an empirical approach in developing theories of coordination. We are creating for benchmark tests a representative, easily modifiable and parametrizable simulation model of three large classes of MAS. We then observe and measure the effect of a set of control variables on the quality of coordination. We then form high-level, orthogonal emergent variables using the multivari-

*Figure 1. The metaphorical production plan, the P-tree, is an AND-tree. Leaf nodes reference raw materials or subcomponents provided. Higher level process nodes correspond to manufacturing/ assembly operations. Each process node may be associated with an OR-subtree (not shown).*




ate statistical method principal factor/components analysis. (Note that nonlinear and cross-product terms are also to be included in the trial functions. The word "trial" has an important, well-meant property, indicating that preconceived artifacts have no a priori role in the approach.) The emergent variables directly and in a statistically significant manner affect the level of coordination, the system structure and functioning. We then produce on this basis theories of coordination applicable to the three classes of MAS to be discussed below. They will contribute to the creation of design tools and guidelines in the construction of new systems, and trouble-shooting tools for existing suboptimal MAS.

We note this method is analogous to theory formation in physics where experimental results may suggest novel conceptual frameworks that have relevance to phenomena beyond those appearing in the original experiments. We hope that the theory to be developed will help in understanding coordination in general as well as in the creation of models of coordination for specific applications.

## THE THREE TYPES OF MULTI-AGENT SOCIETIES

The first experimental environment, the *P-System* (*P* stands for production), is a metaphorical and abstract version of our Distributed Control of Nationwide Manufacturing Operations system and will be used for the first set of benchmark tests. The model also has correspondence to industrial supply networks and has the following characteristics:

- Communication between agents is asynchronous and over limited bandwidth. It includes request for information, resource or action; task or resource allocation to agents; a piece of information; an acknowledgment, and so forth. Messages can be broadcasted at large, or sent to selected groups of agents or to an individual one on the basis of need-to-know and qualified-to-know.
- The sequence of "manufacturing operations" of a given product defines a hierarchical network of tasks, the *P-tree*, which corresponds (is homomorphic) to the problem-solving network needed by the planning process (see Figure 1). All agents share a global goal structure that forms the basis for the generation of individual goal structures. The agent society can assume an organizational structure ranging from a sharply defined multitier hierarchy to an egalitarian flat structure.
- Although the top layer of the P-tree is an AND-tree, each node can also be associated with an OR-subtree (alternative tasks can accomplish the given job at the respective process node).
- *Planning* is equivalent to assigning the (metaphorical) manufacturing/assembly operations to resources over space and time. An agent with a higher priority task (see below) can obtain a needed resource from another agent with a lower priority task. The latter task is performed with a less satisfactory

resource (more expensive or slower) or preempted until the loaned resource is returned.

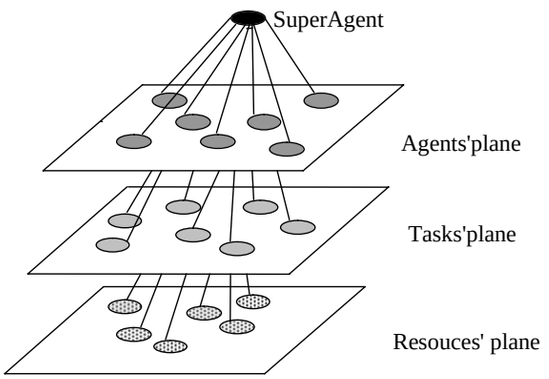
- Tasks may be priority- or deadline-oriented. The former implies that each task associated with the completion of a component must be well-coordinated with the completion of its sibling, ancestor and descendent components. Tasks in the deadline-oriented category have a deadline by which they have to be performed to satisfy the completion constraints of the final product.
- *Resource availability* (tools for the assembly/manufacturing operations) may change intermittently or regularly. Idle allocated resources and the (temporary) storage of components also cost money. The total range of resource availability has four subranges: (1) *infeasible*—the production process cannot function for lack of indispensable resources; (2) *deficient*—the production process can function only if some resources are transferred between process nodes at opportune moments (balancing the costs of transfer and component storage); (3) *scarce*—some tasks must be allocated suboptimal resource types; (4) *abundant*—every task can be allocated the optimum resource type.
- There is *critical dependency*, possible *conflicts*, *incompatibility* and *contests* between subsystems.
- There are three tiers in resource taxonomy: (1) *Resource Category* (every item in it can be used for one or more tasks); (2) a resource category contains one or more *Resource Types* (a given task can be performed at different cost or time levels, depending on the type chosen); (3) one or more *Resource Instances* exist within each resource type—these are actually allocated to tasks.
- *Agents* are associated with process nodes, resource categories and types, are spatially and functionally distributed, assume different levels of autonomy and capabilities in network perception (for reactive behavior), model other agents and the environment (for predictive behavior), maintain network coherence, communication and negotiation, short- and long-term planning, adherence to coordination and cooperation regimes, plan generation and execution for time-critical tasks.
- There are manager agents with different responsibilities. A top-level *Monitor Manager* collects and processes information from the other managers, and stores it in a knowledge base. The *Message Manager* intercepts each message, records the IDs of the agents that originate, transmit and receive it, as well as categorizes and stores them according to their contents type in a *Message Database*. (This is crucial for the trouble-shooting tool.) The *Coordinative Process Manager* is concerned with solution synthesis, reinforcement (such as the support in the coordinator-coworker relationship) and scheduling processes (tasks and resources). The *Manager of Negotiating Processes* assesses how agreements and decisions are made and kept. The *Manager of Neutral Processes* observes the cost and the effect of learning processes. The *Constraints Manager* identifies the cost/benefit ratio of inherent and imposed constraints (capabilities, classes, timing, costs, capacities, resource availability). The collected information is processed by the *Statistical Analyzer Manager*.
- Two objective functions can be used: the P-System is to produce a given number of final products (1) at a minimum cost within a given period of time, or (2) at a given cost within a minimum period of time. Both of these require an optimum allocation of the manufacturing/assembly operations and resources to individual agents over space and time, while satisfying a set of constraints.
- Two objective functions can be used: the P-System is to produce a given number of final products (1) at a minimum cost within a given period of time, or (2) at a given cost within a minimum period of time. Both of these require an optimum allocation of the manufacturing/assembly operations and resources to individual agents over space and time, while satisfying a set of constraints.

We have to define the Quality Measure of Coordination (QMC) to be optimized through experimentation. The P-System is optimally coordinated if subcomponents arrive at every process node simultaneously and at the required rate—while the total production time or cost, respectively, is kept under its allowed level and the total production cost or time, respectively, is minimized. This idea leads to our definition of QMC, based on the concept of synchronization and supply balancing,

$$\mathrm{QMC} = \frac{\sum_{(l)} l \cdot \sum_{(j)} t^{*}_{lj}/t_{lj}}{\sum_{(l)} \left(\sum_{(j)} l_j\right)}$$

Here $l$ is the level number, $l_j$ references the $j$-th process node from the left at level $l$, $t_{lj}$* is the best possible time for assembly/manufacturing at node $l_j$, $t_{lj}$ is the actual time used after local and global optimization (referring to systematic resource exchanges when needed). The weighting factor in the numerator, $S\,l$, expresses the fact that deficient synchronization and supply balance has a detrimental, cascading effect on coordination at the levels above the process node in question. The lower the

*Figure 2. Schematic representation of the connections with the confrontational interactions*




node level, the more serious the effects are. The denominator normalizes QMC to the range [0,1].

The next agent environment is termed the *Confrontational* type and the environment for the empirical study is called the *C- System*. One can visualize it as shown on Figure 2.

The super agent interferes only when the interagent decision making rules, for some reason, are not sufficient – more about it below. The Agents initially have enough "inborn" knowledge to cause each to select the highest priority Task to be accomplished and the best resource type instance needed for the job. (Task descriptors contain the respective Resource needs.) There are three tiers in the Resource taxonomy: (1) resource category—every item in it can be used for one or more specific tasks; (2) a resource category contains one or more resource types (a given task can be performed at different cost or time levels, depending on the type chosen; (3) one or more resource instances exist within each resource type—these are the ones actually allocated to tasks. if the best resource type instance is not available (already assigned to a higher priority task), the next best resource type of the same resource category is looked at if it has an available resource type instance, and so on.

For a given task environment, there are four possible resource availability sub-ranges: (1) infeasible: The production process cannot function for lack of indispensable resources; (2) deficient: The production process functions only if some resources are transferred between process nodes at opportune moments (balancing the costs of transfer and component storage); (3) scarce: Some tasks must be allocated suboptimal resource types; (4) abundant: Every task can be allocated the optimum resource type.

Each task Ti is characterized by a criticality factor, C, which equals the sum of the task's constant importance, I, plus its urgency value that increases over time. When time reaches the critical value,

t=tcr, urgency becomes infinitely large (e.g., *t*cr is the estimated time of impact of an enemy missile).

$$C(T_i) = I(T_i) + \frac{U_0}{t_{cr} - t}$$

The actual generation of the ToC is similar to that with the production-type MAS: We identify a large number of control parameters, each having an effect on the computation and the quality of the runs. The statistical design of the experiments has two phases: (a) the values of the control parameters fall into symbolic ranges, such as *very small*, *small*, *medium*, *large*, *very large*; (b) random selection of numerical values within the appropriate symbolic range. This is necessary since there are no symmetrical, unbiased experimental designs available for such high dimensionality.

We now describe characteristic quality measures to be computed during or after each run of experiments over the time interval $[t_s, t_f]$, $t_s$ being the starting and $t_f$ the finishing time of the run. In the following formulae, the *r*'s reference various rates of events from which the QMC components, *E*'s are formed.

1. **Task Accomplishment:** Let $T_a$ be the number of tasks accomplished, $T_u$ the number of tasks unaccomplished. The first measure is

$$r_1 = \left[1 - \frac{T_u}{T_a + T_u}\right], \qquad E_1 = \frac{\sum_{t_s}^{t_f} r_1}{t_f - t_s}$$

2. **Resource Type Utilization:** In Resource Category C, let the number of unused Resource Types be $N_C(RT_u)$ and the total number of Resource Instances $N_C(RI_t)$. This is summed over all Resource Categories, C:

$$r_2 = \sum_{(C)} \left[1 - \frac{N_c(RT_u)}{N_c(RT_t)}\right], \quad E_2 = \frac{\sum_{t_s}^{t_f} r_2}{t_f - t_s} \quad r_3 = \sum_{(C)} \left[1 - \frac{N_c(RI_u)}{N_c(RI_t)}\right],$$

$$E_3 = \frac{\sum_{t_s}^{t_f} r_3}{t_f - t_s}$$

There are several *time-rates of events* in the whole system that need to be balanced as well as their fluctua-

tion minimized for the benefit of good coordination. These are defined as follows:

$$r_4 = \frac{\text{TaskCompletionRate}}{\text{TaskArrivalRate}}, \quad E_4 = \frac{\sum_{t_s}^{t_f} r_4}{t_f - t_s}, \quad r_5 = 1 - \text{var}(r_4),$$

$$E_5 = \frac{\sum_{t_s}^{t_f} r_5}{t_f - t_s}, \quad r_6 = \frac{\text{ArrivalRateOfUsedResourceInstances}}{\text{RateOfTaskCompletion}},$$

$$E_6 = \frac{\sum_{t_s}^{t_f} r_6}{t_f - t_s}, \quad r_7 = 1 - \text{var}(r_6), \qquad E_7 = \frac{\sum_{t_s}^{t_f} r_7}{t_f - t_s}$$

Note that we can find out the relevance and the extent of importance of the above measures through experimentation. It is true that from the point of view of the whole system, the Es have different levels of importance. We propose as an overall measure of the QMC as follows:

$$QMC = a1.E1 + ... + a7.E7$$

with the constraint that

$$a1 + \ldots + a7 = 1$$

The values of ai, =1,...7 will have to be found by system optimization.

Finally, the third agent environment for our empirical study is of the *Market* type and its environment is called the M-System. It may be active when, e.g., Agents compete for Resources. The following diagram sheds light on this type of structure.

In this area, we have implemented different models of a deregulated electricity market. The models vary in the types of interaction between buyers and sellers, the mechanisms used to transact deals in the market, and in the role of the central agent. Extensive experiments were conducted on the models to determine the type of market structure best suited for trading. The criteria of evaluation were based on resource consumption, number of deals completed, demand satisfied, supply used, excess-over-need bought, and prices paid. The conclusions should be applicable to other deregulated consumer markets of "perishable" commodities with strong time dependence. We have implemented different models of a deregulated electricity market. The models vary in the types of interaction between buyers and sellers, the mechanisms used to transact deals in the market, and in the role of the central agent. Extensive experiments were then conducted on the models to determine the type of market structure best suited for trading. The criteria of evaluation were based on resource consumption, number of deals completed, demand satisfied, supply used, excess-over-need bought, and prices paid. The conclusions should be applicable to other deregulated consumer markets of "perishable" commodities with strong time dependence. A detailed discussion of this type of MAS would be beyond the scope of such short contribution.

*Figure 3. Schematic representation of the m-system*


## CLOSING WORDS

Finally, a short justification of why the present contribution may be relevant to the analysis of e-government. Computer-based multi-agent systems attempt to describe, simulate, study and optimize many important aspects of human as well as artificial societies. Coordination is one of the primary requirements in any society. The present article aims at the analysis and optimization of coordination. It thus provides a theoretical basis as well as heuristic tools to understand the functioning of the societal setting. It is worth stressing that coordination is one of the core functions of any public organization as they need to manage their governance, development and service processes in an increasingly complex environment. When applied to the basic processes of e-government, multi-agent systems give operational tools to analyze and develop the coordination of computer-assisted governance networks and systems.

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## KEY TERMS

**Agent:** A software unit that is capable to transform its environment to achieve some goal. They can be cooperative, centrally managed or self-interested.

**Coordination:** The process of managing dependencies and constraints between activities.

**Coordination Theory:** The set of axioms, constructs and analytical techniques used to create a model of dependency management in multi-agent systems.

**Distributed Artificial Intelligence:** At times identified with multi-agent systems, although some researchers consider it a more encompassing area of research.

**Environment of the Agents:** Can be completely or partially accessible by them, deterministic or nondeterministic, static or dynamic, and discrete or continuous.

**Multi-Agent Systems:** Consist of autonomous, cooperative, possibly specialized intelligent individual agents, capable of making independent decisions and which cooperate toward some common goals. They can represent a software engineering paradigm with interacting components, a human society, or any complex, nondeterministic complex entity.

## ENDNOTE

[1] In this context, *analysis* and *design* go beyond the ambits of software engineering and distributed systems research because agent intelligence, coordination and conflict resolution methods must be taken into account in addition to system structure, component interfaces, and synchronization considerations.

# Back–Office Integration for Online Services between Organizations



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## INTRODUCTION

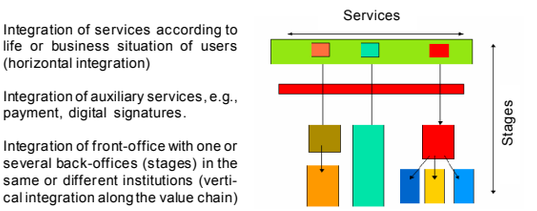
The issue of back-office integration has gained increasing importance within the political e-government debate and e-government research, after the original optimistic expectations for quick gains or digital wonders could not be realized. The term *back office* is defined from the position of a customer or client and distinguishes tasks and processes in relation to a front office, which may be a real office or, in the context of e-government, an additional Web interface for the online delivery of governmental services. Surveys of the European Commission show that by now almost all governmental agencies have their Web sites, offer information about their services in these virtual front-offices and can be contacted by e-mail (CEC, 2004, 2005). Many forms can be downloaded and often filled in online and sent electronically. But only in a few cases, permits and certificates are delivered electronically in return. Incoming electronic forms quite often go to an electronic in-basket and public servants print them or enter data, by copy and paste, in the regular IT systems for the respective service, the so-called legacy system.

From the point of view of the customers (citizens or business), this state of online offers is a lack of fulfillment and service quality; to the administration it means additional cost without savings on other costs by the online tools. The reason for these shortcomings is the missing integration of the Web front ends with the existing legacy systems (i.e., the lack of back-office integration).

Within the recent e-government reviews and analyses, this diagnosis is explained by models of development stages. According to most of these models, the development of e-government systems (and similarly e-commerce systems) follows four stages, but differently defined. With regard to the functions offered online on the governmental Web sites, consulting companies such as Arthur Anderson or the Gartner Group distinguish information, communication and transaction as stages which are developed one after the other, followed by "transformation" as a fourth stage, where the organization (process and/or structure) of the governmental units is changed in order to fully exploit the potential for increase of service quality and/or cost reduction. The OECD report on E-Government (OECD, 2003) introduces a slightly different stage model, distinguishing (1) information, (2) interactive information, (3) transaction, and (4) data sharing, and pointing to the interorganizational dimension of back-office integration. In an early stage model Layne and Lee (2001) distinguish (1) catalogue, (2) transaction, (3) vertical integration, and (4) horizontal integration predicting progress towards higher levels of integration between different levels and branches of government. In order to provide full online service delivery via the virtual front-office, it is in many cases not sufficient to integrate the front-office with only one back office, but also with back offices of other agencies or to exchange information between two or more back offices of different agencies. Full exploitation of the potential of the Internet therefore in many cases affords interorganizational integration which in turn requires interoperability between the systems involved and perhaps transformation of the network of the agencies concerned.

While there is high agreement about the importance of interorganizational integration, the subject is still not well researched, the different options and their benefits and risks not well analyzed. According to Scholl, back-office integration so far has remained grossly understudied (Scholl, 2005b, p. 7), "which is not surprising given the limited experience with online services at this stage" (OECD, 2003, p. 73). There is research on electronic data interchange between private enterprises and interorganizational information systems in the business sector for more than 20 years (Cash, 1985; Eom, 2005; Kubicek, 1993; Porter & Millar, 1985 ), but only a few

*Figure 1. Dimension of integration in e-government*




contributions deal with interorganizational information systems in government. In some respect, research on collaboration and information sharing between governments (Dawes, 2003) is relevant, but adopts a slightly different focus. Unfortunately, insights from the business sector cannot be generally transferred to the public sector because interorganizational relations in particular are quite different. Private enterprises necessarily exchange information with many suppliers and many customers under the pressure of market competition, while governmental units on all levels most frequently have their geographical or subject-related jurisdiction in a form of monopoly. Therefore traditionally there was not much need for data exchange with many other agencies. Scholl, in addition, points to the fact that the public sector is subject to a system of deliberate checks and balances with a strong demand for a division of power which also sets limits to open flows of information and interoperability of systems (Scholl, 2005a). The silo type of organization within government is manifested in incompatible IT systems and closed proprietary networks. The Internet has brought technical interoperability and the private service sector has raised expectations with regard to customer orientation of public services. Therefore, the need for progress in this direction is stressed on all political levels.

Within the European Union, the Ministerial Conference on E-Government in 2001 already asked for support of back-office integration and the Commission ordered a qualitative benchmarking of good practice cases in back-office integration, which was carried out by the authors of this article in 2003. The approach adopted in the study as well as some of the findings can contribute to a more differentiated understanding of the new and multi-faceted issue of back-office integration in and between governmental agencies. In this article, four types of back-office integration are presented which have been employed in a comparative good practice analysis in the European Community in 2003 (Millard, Iversen, Kubicek, Westholm, & Cimander, 2004). Three organizational models will be identified which serve as alternative options in order to achieve a higher degree of back-office integration by reorganizing back-offices. While two of these are derived from established organization theory (centralization and standardization), the third model "clearinghouses" has gained increasing importance in practice but rather neglected in the literature on interorganizational information systems and back-office integration.

## BACKGROUND

Starting from the assumption that a higher degree of back-office integration yields greater benefits for the agencies involved as well as for their customers, it is necessary to distinguish and measure different degrees. For the European Benchmarking Study, four types of back-office integration have been distinguished, each differentiated by different degrees of digitization or automation. This typology starts from the more basic differentiation between three dimensions of integration a back-office can achieve (see Figure 1).

A back office may be defined as an organizational unit using an ICT application to provide a governmental service to customers or other back offices by receiving, processing and distributing information in electronic form. When two or more back offices are involved in order to produce the respective service, they may belong to the same or different government agencies. In contrast to a back-office, a government agency is a formal organization with a formal purpose and a separate legal standing and a ruling body at the top of the hierarchy (e.g., a city government, a regional board or a ministry). An agency usually includes several back offices as departments or other kind of subunits devoted to different services. If two or more back offices of one agency are involved, we speak of intraorganizational integration; when they belong to different agencies, we speak of interorganizational integration.

The term *integration* relates to the organizational and technical flow of information and the related workflows or processes within and between the respective back offices. Back-office reorganization or transformation according to the terminology of the stages models happens

when these processes and/or the structure of back-offices are changed in order to improve these workflows.

With regard to the online delivery of governmental services, at least three dimensions of integration can be distinguished, depending on what kind of processes are to be integrated. Similar to the stages model of Layne and Lee (2001) and the classification of interorganizational information systems in the business sector by Hong (2005), we distinguish between horizontal and vertical integration.

Vertical integration refers to the linkage of processes between back offices, which contribute to different stages of the production and delivery of a governmental service. They perform different tasks in a supply chain and are in sequential interdependency from each other. While Hong defines horizontal integration for the business sector as the linkage of a group of homogeneous organizations contributing identical inputs towards the augmented output (2005), in the context of e-government horizontal integration occurs in two forms with different dimensions of homogeneity. The first one is also named one-stop government and represented by integrated portals, offering a number of services, produced by different back-offices but addressing the same group of customers. Most prominent is the integration of different services according to life events (cf. Hagen & Kubicek, 2000). The second form of horizontal integration concerns the exchange of information between agencies performing the same tasks in different geographical districts.

A third dimension of integration which is not mentioned in the literature so far but which in practice is a necessary condition for a complete online delivery concerns the integration of auxiliary services. Horizontal and vertical integration refer to governmental services which are related to the primary task of the agencies and primary concerns of the customer, e.g., getting a permit. In order to achieve this primary goal, additional processes have to be fulfilled; in particular paying required fees and/or using digital signatures to sign an application. These auxiliary processes usually involve third party agencies such as credit card organizations and trust centers. Only if these processes are integrated with the primary process(es), a complete online delivery of a governmental service is possible.

Based on these three dimensions, four types of back-office integration can be defined which distinguish different degrees of back-office integration. By combining the horizontal and the vertical dimension, referring to the integration of services respectively stages, there are four types:

- **Type A: One Service, One Stage:** The service offered in the front-office is produced by one back office only.
- **Type B: Multiservice, One Stage:** Two or more services are integrated according to citizens' life events or business needs.
- **Type C: One Service, Multistage:** A service to a customer requires contributions of two or more back-offices on different stages of the supply chain.
- **Type D: Multiservice, Multistage:** Two or more services addressing the same customers require the contributions of two or more back offices each. Customers can receive these services by entering identical data for different services only once.

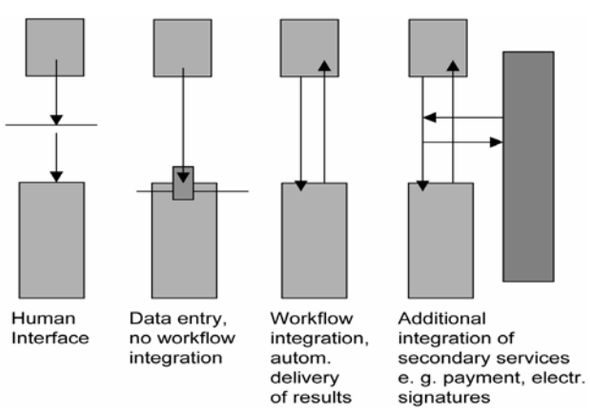
Rather these four types represent different degrees of complexity. However, we are not sure whether they represent four degrees on a ranking scale and whether the assumption by Layne and Lee (2001) is valid for all areas and different situations that horizontal integration is more complex and sophisticated than vertical integration. Not every government service is suited for integration with other services and not every service requires the contributions of two or more back offices. The four types therefore describe different contexts for achieving different kinds of integration.

In each of these four contexts, different degrees of integration can be established. In the Study, they are called degrees of digitization, referring to a continuous digital processing and exchange between the back-offices involved, on the highest level without any change of media and any human intervention. One may also speak of different degrees of automation.

At least four degrees of digitization or automation can be distinguished (see Figure 2):

1. **Human Interface:** The interaction between the customer and the BO-system is only partially mediated by a human agent, e.g. by an employee who

*Figure 2. Different degrees of digitization*



reads e-mail or PDF-forms from the user, checks the data, then keys them into the BO system, and also checks the output generated by the system before having it sent electronically or on paper to the customer.

2. **Automatic Input but Human Interface in Output Response:** The customer can enter his data directly into the BO system, but the generated output still has to be checked and dispatched by an employee.
3. **Full Automation:** The interaction between the user and the BO system is fully digitized and the only need for human intervention is in exceptional circumstances.
4. The highest level of digitization is reached when in addition auxiliary services, such as electronic payment or authentication of digital signature are also integrated without any human intervention.

## ORGANIZATIONAL MODELS

In the above mentioned study on back-office reorganization, 29 good practice cases within the former 15 member states as well as Norway and Iceland were identified representing the most advanced degrees of back-office integration for the 20 reference services used by the European Commission for the comparative benchmarking of advanced back-office integration in e-government. They include services to citizens and business such as certificates and permits and paying taxes and social contributions. The selection of these cases was conducted by e-government experts in each country following the same selection criteria based on the four types and the four degrees as defined above. At the time of this survey, none of the experts could find a Type D case with a degree of digitization higher than two. As such a survey cannot guarantee validity of the comparisons and as progress may have occurred in the meantime, we will not report on the distribution of cases according to countries and services (cf. the full report by Kubicek, Millard, & Westholm, 2003, for methodology; Millard et al., 2004, for findings and extensive case descriptions).

Of more general and lasting importance is the classification of the organizational models which were applied in these cases in order to achieve and maintain a rather high degree of integration. This issue is of particular relevance as the e-government research literature does not provide empirically based typologies or taxonomies of different organizational models or options for achieving back-office integration. These are case studies of integration in particular areas of government for information sharing (Bekkers, 2005; Dawes, 2003; Homburg, 1999, Homburg & Bekkers, 2002). And, as mentioned above, the classifications and typologies developed for the private sector and e-commerce do not fit the particular situation of and between governmental agencies. Meanwhile there are interoperability frameworks and programs by national governments. They differentiate between technical, semantic and organizational interoperability, for example. While the options for technical interoperability in terms of standards are well described and the methodology for achieving semantic interoperability is available, also in this context there is no established knowledge of how to achieve organizational interoperability although this is of great interest to all parties involved (Kubicek & Cimander, 2006).

We started classifying the 29 cases using a typology of coordination mechanisms in organization theory in particular distinguishing between centralization of tasks and the standardization of procedures. If certain tasks in an organization such as purchasing, IT management or personnel development are to be coordinated, they either can be centralized in one unit and be put under control of one leader, or a set of rules for procedures is defined to which the decentralist units have to adhere (cf. March & Simon, 1958). Similar is the development in interorganizational information systems: The organizations involved either establish a common central system with input/output interfaces to their own systems or they define or adopt a set of technical standards and interfaces and agree on corresponding work processes.

### Option 1: Centralization of Back Offices

If cooperation and data exchange between different offices is not working satisfactory and problems in service quality or cost increases raise public concern, what comes to the mind of political leaders first is centralization, that is, putting them under one organizational command or at least to centralize some of their functions, in particular data storage and retrieval. Such concentration can provide strong rationalization benefits which focus expertise, reduce errors and time delays, and are able to exploit economies of scale.

As a general rule, the centralization of the back-office and/or of data sources can make sense for services or aspects of services which are standardized across a large geographic area, normally a nation or federal state. For example, some years ago Austria centralized the numerous local systems for citizens' registration. Other examples in the good practice case selection are the income tax solutions in Finland and Spain and the student grants in the Netherlands. Where a service or an aspect of a service is dependent upon local needs or democracy, or where physical delivery is a necessary component of service delivery, it may make sense to decentralize the

front-office at the same time. An example for this option is the reorganization of car registration in Italy with two central registers and the car dealers as new decentralized registration offices (Millard et al., 2004).

## Option 2: Standardization of Interorganizational Workflow

In some cases there may be legal or political barriers to centralization. At least from a technical point of view, the standardization of workflows and interfaces is an equivalent to the centralization of systems and data sources. In particular the specific mechanisms of checks and balances in the governmental sector and concerns for the citizen's privacy as well as different political affiliations are barriers to centralization in many cases, and standardization seems to offer an increase of technical efficiency while maintaining the political status quo. But the standardization of workflows and technical interfaces requires much more coordinated planning within and between the back-offices involved. The basic work processes within each back office may stay unchanged, but the workflows, that is, the detailed steps almost always have to be adapted. A necessary condition is in any case agreement on data exchange formats at the syntactic and semantic level, for example, EDIFACT or XML and concrete message types. In order to establish interorganizational workflows with minimal human intervention, this has to be embedded in an agreement on gateway workflows which define how input is handled by the receiving next-stage back office, whether receipts or confirmations are sent back and so forth. In order to allow for control over the whole chain, additional workflows have to be set up for tracking and tracing of requests and so forth. For this purpose, systems for identifying customers, applications etc. have to be adapted or a new common system across the different back offices has to be established.

A good example for this model is the reorganization of child allowances in Ireland. Besides the hospital where a child is born at least three different agencies are usually involved: The birth of the child has to be certified by the registrar, based on the birth certificate the child has to be registered in the citizen register, and only then allowance may be applied for by the parents. While in many countries parents have to go to one agency, apply for the respective document and take it to the next agency, in Ireland an interorganizational workflow has been established between the hospitals, the local registrar's office, and the (central) General Register Office. For the electronic data interchange, a naked object architecture running on Compaq's OpenVMS platform had to be agreed upon and a new personal public service number as identifier during the whole process had to be introduced (Millard et al., 2004).

## Option 3: Joint Clearinghouses

The most interesting finding of the survey and the analysis of the 29 good practice cases is that the option of standardization between agencies without any kind of centralization was only found in two cases, while in most other cases standardization of workflows and interfaces was supported by some functions performed by a clearinghouse. Whereas in the case of centralization a central database is created and usually some decision making is centralized as well, in the clearinghouse model each participating agencies keeps its decentralist databases and full decision making authority, but uses supporting services offered by a clearinghouse. These include in particular routing and directory service repacking of data transmissions, adaptation of exchange formats and different versions of standards and so forth.

Clearinghouses represent a certain type of new electronic intermediaries which were discussed in the literature on e-commerce in the mid-nineties (cf. Sarkar, Butler, & Steinfield, 1995).

A relevant example of this organizational model is business social contributions by employers in Belgium. In this case, an autonomous public office called the Crossroads Bank for Social Security (CBSS) was established in 1991, not as a centralized database, but in order to manage registers about the location and type/format of the data it needs, and for whom and for which purpose these data can be accessed. The objective of the CBSS clearing house is therefore to identify and route data, regardless of its format. It is thus a highly intelligent data exchange mechanism rather than a large centralized database in its own right.

The users in this case are different employers, each of whom may have different data systems and formats, and each of which needs to communicate with a variety of different social security institutions, which again use different data systems, on behalf of each of their individual employees regarding social insurance, holidays, illness, accidents, family allowances, and so forth.

# FUTURE TRENDS

The three organizational models distinguished in this article are functionally equivalent. Cultural and political factors have influenced the choice in each case. Also services largely differ in their supply chain structure and are not equally suited for horizontal integration according to life events either. And there may be other factors

explaining why a certain option has been chosen in a certain situation. In organization theory in the late 1960s and early 1970s, the contingency approach was developed in order to explain different organizational structures of industrial companies by context factors such as size, technology, environment or tradition (Lawrence & Lorsch, 1967; Pugh, Hickson, Hinings, & Turner, 1969). In a similar way it should be possible to identify contextual variables or contingency factors explaining the choice of the organizational model of back-office integration. In addition, meaningful hypotheses have to be developed why in a certain situation a certain model fits better than other ones.

As the models provide for coordination, and coordination is to deal with interdependencies, a working hypothesis could relate the choice of the model to the kind of interdependency which has to be managed. Emery (1969) distinguished these types of interdependencies:

- Sequential interdependencies arise when a process depends on the output of another process;
- Pooled interdependencies arise when two or more processes depend on the same pool of resources, in our case in particular data;
- Reciprocal interdependencies exist when each process depends on the output of the other one.

We may assume that the standardization of interorganizational workflows fits to manage sequential interdependencies while centralization and clearing houses are more appropriate to deal with pooled interdependencies. Both are functionally equivalent but differ with regard to power distribution. Therefore where there is a strong ruling body, centralization will be chosen while under a more even power distribution a clearinghouse might emerge as a joint venture. This simple assignment could be tested by empirical comparative research and then probably be differentiated by introducing additional contingency factors.

Additional factors and contingencies may be extracted from other case studies of interorganizational cooperation in the government sector. Homburg and Bekkers (2002) as well as Scholl (2005a) emphasize the importance of cultural factors. From the analysis of the 29 good practice cases the importance of a history and tradition of cooperation can be concluded. Large-scale technical integration mostly occurred where there was already some established cooperation which then was extended and made more efficient by technical integration. Technology seems to be a facilitator or supporter but not the main driver.

As was already stressed in the Introduction, back-office integration in e-government is not only a new field of research, but also a relatively new development in administrative practice, but will attain much more attention. While the research reported here concentrated on back-office integration for governmental services for citizens and business, this could be compared with developments in the area of public security and related services where progress seems to be greater, but deeper knowledge is also harder to get and to publish.

## CONCLUSION

Citizens and business as customers of (e-)governmental services demand better public service quality regarding easier and ubiquitous access. Government agencies are under pressure to save costs and increase efficiency. To reach these objectives, integration of the web front-ends with the existing legacy systems as well as the integration and reorganization among different back offices is a necessity.

On the basis of analysis of 29 cases of good back office integration, in this article we distinguish three functionally equivalent organizational models: Centralization of back-offices, standardization of interorganizational workflow, and joint clearinghouses. Mainly cultural and political factors have influenced the choice in each case. The option of standardization between agencies without any kind of centralization was only found twice while in most other cases standardization of workflows and interfaces was supported by some functions performed by a clearinghouse. For future research, we suggest to adopt the contingency approach from organization theory identifying context factors such as size, organization, environment, tradition, or others to explain, why a certain option has been chosen in a certain situation.

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## KEY TERMS

**Back Office:** The term *back office* is defined from the position of a customer or client and distinguishes tasks and processes in relation to a front office, which may be a real office or, in the context of e-government, an additional web interface for the online delivery of governmen-

tal services. In some cases such a service is produced by one unit or back-office, in other cases several back offices of the same service supplier agency or of different agencies, at the same government level or at different levels may be involved.

**Integration:** With regard to e-government, at least three dimensions can be distinguished relating to what has to be put together with what else and for which purposes: Integration of services according to life or business situation of users (*horizontal integration*); integration of auxiliary services, for example, authentication, payment; integration of front-offices with one or several back-offices (stages) in the same or different agencies (*vertical integration* along the value chain).

**Interoperability:** Interoperability between systems is defined as "The ability of two or more systems or components to exchange information and to use the information that has been exchanged" (IEEE Standard Computer Dictionary). Within the context of e-government there are slightly different definitions, for example, strengthening the aspect by which this interlinking of systems, information and ways of working will occur: within or between administrations, nationally or across federations of states, or with the business sector.

**One Stop Government:** OSG covers the integration of a couple of services which usually are requested in combination due to a certain life situation or for other reasons and which make use of the same data. In order to increase benefits or convenience for the customer by having him to enter his data only once, as well as to reduce the cost of processing data, the integration of two or more services, using the same data, is promising.

**Organizational Interoperability:** OI is concerned with defining business goals, modelling business processes and bringing about the collaboration of administrations that wish to exchange information but that may have a different internal organization and structure for their operations. Therefore, OI also deals with the interorganizational coordination of workflows.

**Reorganization of Back Offices:** The term refers to changes in workflows or changes in the structure of one or more agencies involved, that is, the distribution of authority, functions and of tasks, which occur when making services available online. Reorganization is important because the greatest benefits of e-government do not come from replicating paper based processes directly in a computer system, but rather from using the potential of the technology to reengineer the process and to check whether each step is still necessary, whether steps might be merged or abandoned at all, and so forth.

**Semantic Interoperability:** SI is concerned with ensuring that the precise meaning of exchanged information is understandable by any other application not initially developed for this purpose. Semantic interoperability enables systems to combine received information with other information resources and to process it in a meaningful manner. It refers to meta-data, ontologies and similar issues.

**Technical Interoperability:** TI covers the technical issues of linking up computer systems and services via (tele)communication networks. This includes key aspects such as open interfaces between different transmission systems, interconnection services, data integration and middleware, data presentation and exchange, accessibility and security services.

# Bavarian Secondary Modern Schools



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## INTRODUCTION

Since the late 1990s, commercial use of the Internet has increased. Many schools have started to use this new technology for presentations and have been sponsored by several initiatives like "Schulen ans Netz."

The eight ministerial service centres (Ministerialbeauftragte, MB) for the Bavarian secondary modern schools started to think about the use of the Internet, too. To get the best profit out of the Internet it was decided to combine the existing homepages of the *MB*s together on one platform for the Realschulen. The Bavarian Realschulen have a long tradition on IT as a subject, so a team of 24 teachers with special knowledge in creating websites and open source technologies (php, MySQL) was formed in 1999 to work out a concept for the Internet platform. In September 2000 the Bayerisches Realschulnetz (*BRN*) (www.realschule.bayer.de) went online for the first time. During the following 5 years, the project has developed into a one-stop-shop for all parties concerning the Bavarian Realschule.

## BACKGROUND

### School Development—A New Challenge to Improve Education

Thinking about the use of ICT at schools, the first thing that comes to one's mind is e-learning. E-government doesn't seem to be relevant for work at schools. But situations at schools have changed during the last seven to ten years and there are new challenges to deal with.

In 1999, Bavarian Ministry of Education started a project called "school-development with the aim to give all school types new challenges and to guarantee the highest standard of educational quality.

School development comprises three branches: organisational development, personnel development and educational development (Bayerisches Staatsministerium für Unterricht und Kultus, 2004).

Organisational development means to open schools to the public in two ways: to win over local institutions, enterprises and educational institutions in the neighbourhood to use their resources and to enlist parents and pupils for cooperation.

Gaining public interest in schools and involving and engaging parents and the community into the learning process blurs the boundaries between school, home and community (Brooks & Brady, 2004). Students will get a feeling for what is meant by the term *lifelong learning*.

Educational development means new forms of instruction by using new media and ICT, training students in social and methodical skills and teamwork.

To be successful, teachers have to be able to use the new skills (e.g., the use of ICT in class) and to act as coaches in the classroom instead of being traditional teachers.

To support the school development an unfiltered flow of information is necessary. Every member of the school community has to get the information he needs for his work. This means providing information about the different types of schools, their school policies, their curricula and the possibilities of further training (e.g., continuative schooling, vocational training). Parents and pupils need a solid database to make the right choice for their school type. Information about relevant laws and decrees and their actual changes belonging to the type of school and information for teachers about further training offers and educational material have to be available, too.

School development causes big efforts for everyone, especially for teachers and principals who need additional time to realize the project. However, administrative work increases and therefore a simplification of administrative work will save money and time for educational objects. Change management at schools at all levels is necessary to achieve this aim.

Taking the two points—open information for everybody and an organisational changing—together the result is e-government at schools.

Paul Timmers (2004), head of Unit eGovernment at the Directorate General Information Society at the European Commission, defined e-government as the "use of ICT together with organisational change and the acquisition of new skills in public administrations, in order to improve public services and democratic processes".

Giving free information to everyone, raising the possibility for all participants at school to transact and interact with others and to participate in decisions will strengthen democratic processes at schools. Especially parents and pupils can influence their school's development and hence their schooling. In the end the public can

carry out the most important role of democracy: the control of governmental duties which means in this case the quality of education.

## CHANGING THE WAY OF LEARNING

To reach high quality in education it is not enough to change the schools' organisation and to give parents and pupils the right to participate in their school's development. Besides it is necessary, to change the way of learning. Learning is an active process, so it is not the teacher who can teach someone something. Learning is the pupils' responsibility and teachers should act more as coaches who help them to organise their learning. Therefore it must be kept in mind that learning is something very individual. Everyone learns in different ways and at a different speed and has different kinds of interests. The consequence is that learning has to be personalised and individualised, which means it has to be tailored to "meet the needs of each student, taking account of learning styles and learning preferences allowing students to pursue their studies with a range of resources tailored to their individual needs and interests" (Selinger, 2004, p. 8). This sounds like isolated work, but in fact it is not because pupils can decide how long they want to work on a subject.

Knowledge is actually constructed in collaborations among learners (Brown & Duguid, 2002). The usual places for learning are the schools, but if the individual learning should be respected, a possibility to abolish the restriction to one place is needed (schools will not be obsolete in the future but there will be different places where learning will take place). ICT provides the tools to tailor learning and to bring together all participants in learning even away from school.

It is a precondition to have an appropriate ICT equipment at the schools, an affordable broadband connection for everyone and useful e-content to use the advantages of e-learning.

Because teachers tend to teach as they were taught, a constant training and retraining of teachers is necessary to achieve progress or change in classroom (English, 2004).

## BRN: SERVICE AND INFORMATION PROVIDED FOR THE REALSCHULEN

To meet these challenges and to support the Bavarian secondary modern schools the Bayerisches Realschulnetz went online in 2000. The three main targets the project stands for are reduction of administrative work at all levels, support of the teachers' work and more transparency of the Realschulen to the public. The following objectives of the BRN were set out to reach these targets:

1. Availability of general information for parents, pupils and partners and obtainability of basic information about every *Realschule* in Bavaria (headmaster, number of pupils, classes, contact details)
2. Availability of information for everyone interested, including all laws and decrees relevant to the Realschule
3. Quick posting of official publications
4. Presentation of offers for further education (regional and supraregional)
5. Provision of teaching and advisory materials
6. Simplification of administrative work
7. Strict focus of the BRN on its customers' needs

Customer orientation became the main principle of the team's work. Several portals have been designed for the different target groups (pupils, parents, teachers, principals, students, probationary teachers) where specific information is offered.

To achieve a barrier free flow of information, a database-driven news system, the MB-Nachrichten, was created. News and information can be provided in real time by the board of control without any restriction of accessibility. The MB-Nachrichten replaced a newsletter which was sent periodically every 4 to 6 weeks. To get the best benefit of the system, each piece of new information can be forwarded by mail, dates can be transferred into an electronic scheduler and the news can carry several addendums (documents, forms, URLs) which can be followed up electronically to reduce changes in format.

The implementation of the MB-Nachrichten has had a bearing on back office processes on the level of MBs and principals. One result was the unification of the communication channels, which lead to savings in terms of costs and time in the school administration. With MB-Nachrichten BRN established a backbone for an IT-based knowledge management at schools.

To take advantage of synergy effects in order to help teachers to save time in their preparation for lessons a database with teaching and educational material was installed. Teachers can search for and spread their own teaching material to the benefit of all. New concepts for teaching can be exchanged for the benefit of educational development.

A database with all regional and links to all supraregional further training offers as well as an extended job service complete the administrative service for schools. Especially the support of Ministry of Education with the open transfer procedure via BRN enables princi-

pals to see all staff movements at their school planned by the Ministry of Education. This gives them the chance to start planning for the next school year much earlier and to avoid mistakes.

To assist parents and pupils on their search for a *Realschule* in their region, the *BRN* provides topical basic data from each *Realschule* in Bavaria. They get information about compulsory and optional subjects, final examinations and the possibilities of collaboration in the boards of the school (e.g., parents' association, pupils' association).

The most important laws and decrees concerning the *Realschule* (e.g., Bavarian Education Law, regularities for the *Realschulen*), the curricula and the decrees concerning the training of teachers can be seen online, with most of them providing the possibility to search for keywords. So everyone who is interested can get valuable information.

A guest book service for individual requests completes the offer of the BRN.

The effect of all these arrangements was transparency at the *Realschule* and a flattening of the strong hierarchical structures of secondary modern school at least in the flow of information.

## E-LEARNING IN PUBLIC-PRIVATE PARTNERSHIP

The e-learning sector of *BRN* is just under development. Together with Audi, a Bavarian car manufacturer, the *Realschulen* started to bring up e-learning modules for mathematics in 2003.

Audi has had a long e-learning tradition and the necessary software, teachers can provide their pedagogical experience. Based on the basic knowledge which is stated in the Bavarian curriculum for the *Realschulen* for each grade and subject, modules are worked out.

The first module will handle with measurements: length, time, mass, and money. All modules will be built up in a similar way: The first part is an introduction into the topic. It provides all basic information one needs to deal with it. In the second part problems are packed into a context and the pupils play a role to solve different problems. This means they have to collect different kinds of information, put them together and work out several intermediate steps towards the solution. In each step they get a feedback about their solution and help if needed. Pupils can choose whether they start the module at the very beginning or step into a specific problem at the training area.

The modules can be used at home to deepen the subject matter or to fill a gap in the basic knowledge. They can be used in school, too, to give students a stimulation to do mathematics in addition to the classical school book or to do self studies during stand-in classes.

Ending up this project, the whole basic knowledge of mathematics at Realschulen from Grade 5 to 10 will be available as e-learning modules. It will give advantage to students who get prepared for an examination. Teachers can save time at class because the responsibility of repetition of basic knowledge can be delegated to the students.

## FUTURE TRENDS

The value of e-learning is evidenced by studies such as Cox and Abott (2004). There are many initiatives all over the world to enforce the use of ICT in schools, mostly in context with e-learning. Some initiatives use ICT to stay in contact with parents (Edwards, 2004; English, 2004).

What is missed until now is a study about the potential of e-government at schools to support administrative work and to save costs and time for educational work. BRN is a precursor in this sector.

Finally the success of all ICT initiatives depends on the willingness of policy makers to invest money into an appropriate ICT equipment of school and pupils and into useful content.

## CONCLUSION

Implementing BRN has not always been an easy challenge. Many applications were unthinkable in 2000 when the BRN was started. To see parents and pupils as customers is one aspect of school development. On the other hand, every party of secondary modern school is responsible for the success of the whole organisation and therefore needs information and support. There are still prejudices towards it by higher functionaries in the Ministry of Education but they are decreasing by time. The diversification raised the acceptance of the users and especially teachers and principals cannot imagine working without BRN.

What are the lessons learned by realising the project?

The key of success is customer orientation. A project is worth nothing until it is accepted by the customer himself. So customer relation management is important for successful e-government.

Spreading the work to a team, in the case of BRN a team of teachers spread over whole Bavaria, helps to use synergy effects and raises the acceptance. It is not necessary to go online with applications which are hundred per cent perfect. It is better to start at about 70% and to develop them by taking into account the feedback of the users.

Taking a private public partnership to raise the e-learning project produce synergy effects. School and economy get a new view of each other and can learn and benefit from each other. Involved teachers look upon the experiences on this project as an enrichment for their work at school.

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## KEY TERMS

**E-Learning:** Use of ICT, multimedia and Internet to improve quality of education. E-learning enables for a personalized lifelong learning. E-learning stimulates remote exchange. It reduces the disparity between individuals or groups caused by social differences.

**Lifelong Learning:** Purposeful learning to get an improvement in knowledge, skills and competences. It is not concentrated on education and vocational training but comprises all aspects of changes humans are faced during their lives.

**Ministerialbeauftragter (MB):** A unique institution at Bavarian Realschulen and grammar schools. The *MB*s are the ministerial service centre for their type of school in each Bavarian administrative district. Each *MB* is responsible for 35 to 70 Realschulen. He provides information, organises further trainings and gives advice to the principles. *MB*s act by order of the Ministry of Education.

**One-Stop Shop:** Internet-based platform which accommodates the demands of different groups to one and the same topic.

**Personalized and Individualized Learning:** Student-centred learning respecting individual learning styles and preferences, which is appropriate to student's abilities and level of knowledge and which meets their needs and interests.

**Realschule:** The Realschule (secondary modern school) comprises Grades 5 to 10. It provides an education for young people who are interested in questions of theory, but at the same time have practical inclinations and abilities. General education is provided as well as preparing pupils for vocational training, and it is established between Hauptschule und Gymnasium.

**Synergy Effects:** Synergy effects are generated by a collaboration of human beings with a view to interact and aid one another.

# Benchmarking Electronic Democracy



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## INTRODUCTION

*Electronic democracy refers to the use of information technology (IT) to expedite or transform the idea and practice of democracy.* (Street, 2001, p. 4397)

From the beginning, a common assumption in many discussions of e-democracy is that ICTs have the power to augur in a new political order. There are of course different ideas about what constitutes as an e-democracy, but it appears to be taken for granted that ICTs have this constructive power regardless of the conditions and environment in which they are used (Barber, 1984).

Whilst the most significant experiences in the field of ICTs have been generated by bottom-up processes rooted in civil society, a great deal of e-democracy projects are characterised by the political action of national and supranational institutions. The enormous resources spent on e-democracy initiatives and the institutional structure of democratic societies that place pressure on politicians and decision makers to justify their decisions in relation to those they represent both generate a need for public evaluation tools and shared instruments of analysis. Moreover, as information technology tends to create spaces of interaction that are easily accessible and interconnected on a global scale, the need for standardised empirical definitions and indicators is attracting more and more attention (Gibson, Ward, & Rommele, 2004; Trechsel, Kies, Mendez, & Schmitter, 2004).

Benchmarking, in this context, is a method of analysis that comprises the identification of significant factors that influence the perceived quality of an interactive virtual space and that facilitates a constant process of comparative monitoring and evaluation of experiences. Many institutions and research centres are currently committed to this task, deducing empirical frameworks of analysis from theoretical reflections about computer-mediated communication (CMC) and democracy, whilst simultaneously seeking to improve theories regarding electronic democracy—and democracy *tout court*—by the observation and comparison of diverse projects. The output of this kind of research is often a set of best practices, intended to export successful approaches from one country to another.

## CONCEPTUAL BACKGROUND

The theoretical foundations upon which benchmarking and standardisation depend may be related to the "institutional isomorphism" (Di Maggio & Powell, 1991) that establishes a pattern of analogies between the working of different organisations. This perspective is founded on the idea that technological innovations in different environments all work toward a similar organisational form (La Porte, de Jong, & Demchak, 2002; Zittel & Bush Hall, 2002). From the perspective of values, the strategic choices of key actors and existing institutional forms prior to the advent of ICTs are of little significance (Yang, 2003). This idea has much in common with the technological determinism which contends that the powerful and ubiquitous nature of communication technology and the speed by which it is being implemented may overwhelm the differences between political and institutional contexts and structures. It can be argued, moreover, that a deep conceptual link exists between institutional isomorphism and theories of globalisation. Ideologies of globalisation in actual fact continue to identify the impediments to development with factors internal to nations, emphasising on the other hand the advantages of integration and interdependence in global markets. Thus, institutional isomorphism and benchmarking practices are strictly linked to the possibility—and desirability—of a global organisational harmonisation that should function as a driver of mutual understanding and shared knowledge. These concepts echo the debate which in the social sciences has taken hold since the 1960s, concerning the concept of modernisation, and render extremely pertinent the differences between two kinds of strategic processes often ambiguously included under the same umbrella: electronic democracy and electronic government (Chadwick & May, 2003). While the latter is conceived as a process of public administration rationalisation in bureaucratic structures that are similar in Western countries, e-democracy relates to the transparency of political processes, to participation in public life and to the quality of opinion formation, all factors deeply influenced by socio-economic variables and the political culture in specific contexts. This is the main reason why benchmarking finds its privileged field of implementation in the analysis of

public service delivery, while on the side of democratic quality of life this approach still encounters difficulties and obstacles to its development. Thus, in analysing e-democracy benchmarking we should take into account both the emergence of a new branch of benchmarking, more adapted to the public sector and deliberative networks, and the whole set of theoretical problems posed by the measurement of democracy, by its culturally and ideologically characterised tools, by its assumptions about progress toward (more) democratic government.

## BENCHMARKING: A TECHNICAL OR POLITICAL TOOL?

Benchmarking is an evolving concept that has developed since the 1940s toward more articulated forms. Watson (1993) argues that this practice has evolved through five generations: reverse engineering, competitive benchmarking, process benchmarking, strategic benchmarking, and global benchmarking. This development follows the shifts from a focus on products to one based on processes, from a competitive scenario to an interactive and cooperative one. Most recent studies have, however, discussed two further steps in this evolutionary process. The first, termed "competence benchmarking" or "bench learning," is founded on the idea that organisational change is for the most part based upon individual behaviour and group learning. The second step in the contemporary development of benchmarking is the so-called "network benchmarking," which extends the idea of learning by cooperation beyond the individual and group levels (Kyrö, 2003). New forms of benchmarking, and new fields of application (small firms, public and semipublic sectors, etc.) introduce a wider horizon for benchmarking practices, allowing its adoption even in more articulated and complex areas of policy. One of the areas in which benchmarking is assuming a prominent role in evaluation practices is that of public projects of electronic democracy. In this field, institutional action is benchmarked on the basis of its efforts to enhance democratic life through the use of information and communication technologies. In particular the process of democratic development can occur in three ways: (1) increasing the transparency of the political process, (2) enhancing the direct involvement and participation of citizens, and (3) improving the quality of opinion formation by opening up new spaces of information and deliberation. This conceptual pattern is the outcome of collaboration and research carried out between the European University Institute and the University of Geneva, conducted on the basis of empirical findings concerning the assessment of the impact of new communication tools on the state of democracy in Europe (Trechsel et al., 2004): "the main goal was to design an instrument that not only counted features and assessed quality but also included an evaluation of interactivity. Indeed, it is precisely the latter feature—the increased scope for deliberative and participatory interactivity offered by ICTs—that has been one of the principal concerns of the literature on e-democracy" (p. 11). The quantitative indicators relating to electronic democracy are construed on the basis of the presence of parliament or political party Web sites, with close attention given to communication systems and not merely limited to the distribution of information, but dedicated to citizen participation. The properties of the sites examined are as follows: (1) information provision, (2) bilateral interactivity, (3) multilateral interactivity, and (4) user friendliness. A similar approach is at the root of contributions presented in Brussels at an international seminar on electronic democracy (Riley, 2004), in which the fundamental assumption of the role of national parliaments is the fulcrum of projects of network involvement of citizens:

*There was a consensus that the goals of e-Democracy will not be met by any one particular strata/stratum of society though many thought that the process of e-Democracy should be guided and driven by legislatures as, in the tradition of representative democracy, these bodies are the drivers of democracy.* (p. 3)

In these examples we find a form of benchmarking that is still product oriented, that is limited to the counting of characteristics related to access, usability, and interactivity. Benchmarking electronic democracy is, in other cases, construed on the basis of indicators that measure the participation of citizens in decision-making processes and greater emphasis is placed on experiences in the sectors of e-consultation and e-voting. Examples are provided by the corpus of studies focused on deliberative democracy and online forums. In their general view of the factors that could affect online deliberation, Janssen and Kies (2004) elaborate a "typology based on three general categories that correspond to three avenues in which research could advance in order to get a better understanding of online deliberation: (1) the communicative structure of the discussion space, (2) the "major"/"minor" distinction, and (3) political culture and ideology" (Janssen & Kies, 2004). Relying on the work of Lincoln Dahlberg (2001), whose list of criteria of the idealised public sphere represents, in essence, an operationalisation of Habermasian concepts, the authors find a set of indicators useful for evaluating online forums with deliberative goals. Even more complex is the methodological approach used in a report commissioned recently

by the United Nations (UN) (Cliff, 2004) preliminary to the *United Nations World Public Sector Report*. In echoing the position expressed in the *UN General Assembly Millennium Declaration* (2000), according to which electronic democracy is a "participatory, inclusive, deliberative process of decision-making," "this research takes a comprehensive look at the democratic outcomes that can be sought by government, civil society, and others in order to deepen and enhance participatory democracy online. With a particular focus on e-government and democracy, the vision for online-enhanced participatory democracy, or "e-democracy," relies on an incremental model of development that involves the many democratic sectors and their institutions across society" (p. 2).

Included among the assessment criteria for democratic living are the following: (1) trust and accountability, (2) legitimacy and understanding, (3) citizen satisfaction and service, (4) reach and suitable access, (5) effective representation and policy making, (6) participation through input and consultation, and (7) engagement and deliberation. The factors taken into consideration show how a wider definition of electronic democracy is discussed, pointing out that "the path toward information-age democracy is a deliberative one" (p. 4), particularly because it aims to stimulate direct and mass participation.

A twofold meaning emerges, therefore, of the concept of e-democracy. The first places the use of new technology by formal institutions at the centre of attention, constructing its particular indices on the basis of renewed communicating strategies by political parties, parliaments, and governments. The second, by contrast, emphasises the role of citizens, since greater involvement in public life or greater satisfaction with administrative services are considered evidence for an advanced phase in the realisation of electronic democracy (Coleman, 2005). The two concepts are not incompatible; on the contrary, they suggest the elaboration of more sophisticated evaluation methodologies.

## TOWARD AN ANALYTIC RECOMPOSITION

The benchmarking of electronic democracy brings with it an inherent difficulty: if any type of assessment cannot be detached from a correct definition of the object under examination, then the ambiguity of the concept of democracy (and, by consequence, of electronic democracy) threatens to increase the uncertainty of assessment procedures (Berg-Schlosser, 2004). It has been said of the term "democracy" that it constitutes an indefinite concept, despite its clearly laudatory significance (Sartori, 1987). E-democracy merely adds to the theoretical issues which are still open concerning democracy per se in terms of a still insufficient understanding of the political consequences of benchmarking (Townley, 2005).

Even in a problematic context of basic definitions, it is still useful to outline a conceptual pattern that tempers at least some of the limits recognised previously in the methodology of official reports. In particular, the well-known theoretical framework elaborated roughly 50 years ago by Joseph Schumpeter (1952) is still extremely useful. His definition of democracy in structural terms is based on three elements: (1) pluralist competition between individuals and parties for all government positions; (2) fair citizen participation in the choice of individuals and parties through free elections, held periodically in accordance with established rules; and (3) the possession of political and civil rights, and in particular freedom of expression and of assembly as fundamental conditions for guaranteeing competition and participation.

Despite the limits of many analyses of the subject, the issue of the quality of democracy and its measurement must be carried out by considering each of these factors (Altnam & Perez-Linan, 2001). Above all, it is necessary to reflect on the fact that in Schumpeter's contribution the characteristics of the working of public bureaucracies is not mentioned explicitly, whilst this is a key element in many reports on electronic democracy. In fact, while significant experiences have been accumulated in the field of deliberative democracy, public administration reform still remains the main focus of this kind of analysis.

The objectives of bureaucratic efficiency, equal rights, the accountability of public agencies, and administrative transparency concur undoubtedly in accomplishing democracy, but they should be accomplished prior to Schumpeter's threefold division. It is difficult to imagine the participation of citizens and competition amongst individuals in the absence of good practice in public administration, fundamental for guaranteeing rights in a liberal state, to which reference is made in the third point of Schumpeter's scheme.

On the contrary, it has been affirmed that the restructuring of the public administration is not a presupposition, but is the threshold for introducing or improving democracy (Chadwick, 2003). There are many reasons why in the literature on benchmarking there is a tendency to reduce the concept of electronic democracy to that of administrative democracy. The scarce theoretical understanding of the distinction between the concept of electronic democracy and electronic government and the overestimation of the latter as the starting point for a wider democratic project certainly weighs heavily. However, the ideological presuppositions and political objectives of benchmarking democracy are even more rel-

evant. In the great faith that is demonstrated in the technological factor and the top-down approach of most innovation, there are signs of a logic of development approach once more (West, 2004). In the past, this has been employed by Western countries to interpret and pilot processes of modernisation in those countries which had just come out of colonisation. The same approach has been recovered on a global scale today, to the extent that ICTs are considered as a panacea for the evils of established democracies (for which the definition "deficit of quality" is used) and as an instrument of action in countries of recent democratisation or in the process of democratisation (World Bank, 2002).

## CONCLUSION

No scientific instrument gives us direct, unmediated access to the phenomenon to be measured. Methods of analysis reflect values, cultural propensities, and ideological positions that must be illustrated. When used to improve public organisations, starting from the establishment of new public management, the notion of benchmarking has theoretical foundations rooted in the past, echoing positions that already emerged in the social sciences during the 1960s with reference to the concept of modernisation. Institutional isomorphism, identifying the "one best way," acceptance of the principle of exportability, the guiding role rediscovered by the more advanced countries which have taken upon themselves the task of tracing the path toward democracy, all of these factors are in harmony with dominant positions in relation to development about half a century ago. Possessing a prescriptive nucleus that is very easily identifiable, addressed to action and policy planning, "the perception was that in one way or another, albeit with disjunctures or frictions and with transitory tensions produced by the unequal advance of different dimensions of development, new nations … would move gradually toward societies characterized by welfare, equity, order, democracy, and autonomy" (Filgueira, 2001, p. 3585). A model was thus identified, a model on the scale of Western social systems and the necessity of transplanting this model to countries judged to be lower on the development scale was considered imperative, following procedures of logic taken from the practice of identifying benchmarks and transferring them to different environments (Rupert, 2000).

The analysis of the literature has shown great diversity in approaches to electronic democracy and its benchmarking practices. Some treat the reinforcement of formal representative institutions as the fulcrum of their analysis, with a view to improving communication between those who govern and those who are governed and giving particular attention to the dimension of vertical accountability (Waller, Livesey, & Edin, 2001, p. 5). Others, following a democratic conception of a deliberative kind, highlight, by contrast, the potential of new media to improve communication amongst citizens, beyond the intermediation of political institutions (Riley, 2004). A third approach considers the improvement of public administrations as the principal indicator for measuring the quality of democracy. The concept of electronic democracy and that of electronic government, albeit distinct in conceptual terms, are perceived to be closely entwined. Indeed, the accomplishment of the former often does not constitute an objective in itself but an indirect effect of administrative restructuring (Waller, Livesey, & Edin, 2001).

The benchmarking of electronic democracy should arguably be founded on a method of analysis that takes into account the multidimensional character of the concept of democracy (Bass, 2005). Contributions have recently been produced that move toward a methodology that can recognise differences in quality (as, for example, that of good governance in the public arena and in quality of life (Bovard & Loffler, 2003). The idea that there is just one path of political development in this field is misleading and overlooks this multidimensional characteristic. What is needed, by contrast, is a form of benchmarking that is less conditioned by such ideological connotations. It is also important to enrich this concept by making reference to carefully contextualised models of best practice.

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## KEY TERMS

**Administrative Democracy:** A concept which associates improvements in democracy with progress in public administration, particularly with regard to public involvement in administrative agencies.

**Benchmarking:** A detailed analysis of an electronic reporting programme to determine whether it can be used in whole or in part in another state or agency.

**Best Practices:** Methodologies that provide beneficial results. Some best practices are general in nature and can be applied to almost every industry; other best practices are industry specific.

**Deliberative Democracy:** A term used to refer to any system of political decisions based on some trade-off between consensual decision-making and representative democracy. In contrast to the traditional economics-based rational choice theory of democracy, deliberative democracy theorists argue that legitimate law making can only arise from public debate by the citizenry.

**E-Consultation:** This offers a choice of online public policy topics for discussion with real-time and archived access to audios and videos of public meetings. The government encourages citizens to participate in discussions.

**E-Governance:** This implies the use of ICT channels to change the way citizens and businesses interact with government to enable: (a) citizen involvement in decision making, (b) increased access to information, (c) more transparency, (d) civil society strengthening.

**E-Vote:** E-voting is the possibility to practice political rights with the help of ICT (e.g., using a computer or mobile phone). This includes ballots and signing initiatives and referendums. E-voting in a narrower sense also includes simple ballots on Web sites.

**Institutional Isomorphism:** This is a pattern of analogies between the working of different organisations.

**Policy Learning:** This is a process underlying any changes in the political behaviour of an agency, its portfolio of policy vectors (institutions, programmes, funding schemes, regulatory frameworks, etc.), objectives and management of these, their constitution, and the relative weight of vectors in the portfolio.

**Political Accountability:** This is the principle that governmental decision makers in a democracy ought to be answerable to the people for their actions. The concept implies more than merely the tacit consent of the governed. It implies both a mechanism for the active monitoring of public officials and the means for enforcing public expectations.

**Political Development:** A concept in political science used to describe the processes of nation building and state building. It is closely associated with the concepts of modernisation and economic development, and is now applied to processes of political change throughout the Third World. The idea of political development implies that societies can consciously direct the course of their own nation building rather than submit to the blind forces of social and political evolution or revolution.

# Best Practice in E-Government

B

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## INTRODUCTION

The pressure of modernization does not stop at national boundaries—in this respect it is universal and secular. In some regions of the world the pressure of change is particularly extreme (e.g., in Eastern Europe) where the transformation of the administration from a state socialist to a democratic institution is taking place under the enormous time pressure of complying with the new national and international standards and catching up with the global economy. Another example of a country in transformation that is extremely interested in studying best practices is China where a more efficient public administration is required to support the newly installed market economy whereas e-democracy is no issue at the moment.

In view of this starting point for the universal pressure of change and reform, the responsible decision-makers are often eager to model the direction and implementation of their reforms on the best local communities. The high level of interest in the results of various benchmarking studies among local community representatives stems from this pressure and a great uncertainty about the future of public administration.

Actors and experts throughout the world agree that learning from and transfer of good practices internationally can contribute to the goal of global co-operation in e-government, which is a priority of the World Summit on the Information Society. In its Action Plan, the participants of the World Summit defined as an important action to "support international cooperation initiatives in the field of e-government, in order to enhance transparency, accountability and efficiency at all levels of government" (WSIS, 2003).

In its "Communication" of September 26, 2003 on "The Role of E-government for Europe's Future" (European Commission, 2003) the Commission of the European Communities stresses the huge benefit of initiating an exchange of good practice.

*Best practices encompass technological, organizational, legal, and training elements, they require long-term commitment of all key actors involved, and they illustrate tangible benefits and results. Exchange of experience and replication of best practices can bring cost-savings in moving to broad take-up. It also prepares for future interoperability and interworking between administrations.* (p. 21)

The following discussion aims to introduce a theoretical approach which avoids the limitations of the dominant transfer theories of the "one best way" (Bartlett & Ghoshal, 1989; Ohmae, 1990; Womack, Jonas, & Roos, 1990) on the one hand and "path dependence" (Arthur, 1994; Freyssenet, Maier, Shimizu, & Volpato, 1998; Leipold, 1996; Pierson, 1998) on the other hand, and which creates a perspective for practical action in e-government. Whereas the one best way theory regards the adoption of superior concepts as the royal route to overcoming existing inadequacies, the theory of path dependence sees hardly any possibility to adopt solutions from other national environments—it considers that the bonds of the decisions of the past and inherited structures are too strong.

Therefore, a clear understanding of the opportunities and limits of best practice orientation and adoption gives a clear orientation of what way to go in increasing organizational performance. The basic question is if it is advisable and feasible to adopt practices of a well-performing authority by a less-performing authority in the public administration.

Before presenting empirical material on the question of what a good practice in e-government consists of it is feasible to discuss on a theoretical level principle problems with the concept of best practice.

## BACKGROUND

In the current discussion about the best way for public authorities to develop to modernize administration with the help of e-government, familiar thought patterns from discussions about the prospects of the industrial society in the 1980s or the forms of New Public Management in the 1990s are apparent.

There is often an impression that there can be a generally valid concept of modernization with goals that are defined by a best practice model, and that this model is the final goal of the development of the public administration from a Weber-type administration–characterized by increased effectiveness due to distribution of

competence, a highly formal division of labor, a strict hierarchical structure, impartiality, specific control mechanisms or the lifelong staff remuneration principle—to a flexible organization similar to an economic enterprise with customer orientation, holistic forms of work, performance-oriented remuneration and career patterns and shallow hierarchies.

According to the convergence theory[1], an increasingly trans-national development model for the public sector can be expected in the distant future. Then, the public authorities would be under enormous pressure to act, but at the same time without any clear idea of what action is appropriate, so decision-makers would look to the best practice models and imitate their solutions, thus gaining respite in their complex decision-making situation. Best practice models would then form the reference point for their own decisions on the shape of e-government.

From a theoretical point of view, there are several questions about such a convergence theory. First of all, the fundamental question of when a solution is considered a best practice must be addressed. Obviously, a high degree of abstraction is needed to award existing solutions the epithet of the one best way. The abstraction must transcend the distinctly national specific differences in culture, tradition, state structure, language, attitudes, economic structure, etc. The significance of all of these factors for the structure of society and the state has been discussed in the theories of the national innovation system (Dosi, D'Andrea, & Zysman, 1989) and new institutional economics (Soskice, 1994).

Moreover, best practice is a moving target. Possible solutions which are emulated by a latecomer may already be out of date. Best practices certainly evolve over time, as was impressively shown in the analysis of the development of the governance structures of the U.S. economy (Hollingsworth & Streeck, 1994).

This leads to questions which are very relevant to practical applications. If a solution has been identified as a best practice, can it be copied? What role is played by path dependency (i.e., conditioning by the structure that has grown historically)? Classifying solutions as best practice thus often has an ahistorical component, and this can make them devoid of life and soul in face of the historical development of structures and solutions. And the two concepts, modernization and best practice, are isolated from the different political, economic and cultural structures in which they are firmly embedded.

On the other hand, the concept of path dependency restricts learning to the inner potential of an organization. In that perspective, learning takes place if actors consider the inner potential of a choice, an institution as being limited. That leads to severe problems of operationalization of the concept of the path both in a diachronic and a synchronic perspective. Who determines what time frame to be considered to define the path that sets limits? Authors give different answers. In the transformation debate form socialist to market economy the proposals what has to be regarded as a path determining period differ from stressing the pre-socialist phase (Janos, 1984) to the most recent socialist experience (Crawford & Lijphart, 1997).

And in the synchronic perspective the discourse is not easier. How is it possible to identify those institutions that are decisive to define the path for the further development of an institution?

## EMPIRICAL EVIDENCE ON BEST PRACTICE IN E-GOVERNMENT

Benchmarking studies are published all over the place. Web sites are assessed (Capgemini 2002, 2003, 2004), the e-readiness of countries is examined (Booz, Allen, & Hamilton, 2002) or the availability of services is analyzed (KEeLAN, 2004[2]; West, 2001).

But there exists also another type of analysis that focuses on organizational issues (Millard et al., 2004), on special applications such as e-participation (Malkia, Anttiroiko, & Savolainen, 2004).

To check if a best-practice-model can be derived, six studies are presented that deal with the configuration of success factors of e-government on the local level.

### Local E-Government in a Management Perspective

The project of the British research group from the organizations Socitm and I&DeA on the state of development and the development paths for local e-government in an international perspective regards the phenomenon of the "virtual town hall" especially from a management perspective (Socitm & I&DeA, 2002). The main focus is on the question of what has been achieved internationally and what remains to be done. Research teams from the participating 14 countries contribute best-practices examples or typical cases. The study by the country teams and the evaluation by the British team of authors were oriented towards an analysis concept which expresses a comprehensive conceptual approach (cf. Table 1).

Such an approach based on the complexity of e-government projects is necessary to grasp the respective phenomenon with its specific characteristics, and the only possibility to adopt the consistent maxim for action:

*For the majority, life on the local e-government train will be rather chaotic; identifying opportunities and*

*Table 1. Local government now "Template" (Source: Socitm & I&DeA, 2002, p. 180)*

| Vision | Leadership | Management | Infrastructure |
|---|---|---|---|
| Clear Goals | Fast decisions | Projects | Funding |
| Shared Values | Strategic planning | Risks | Technology |
| Commitment to change | Open to experimentation | Contracts | Security |
| Consultation | Communication | Services | Skills |
| Collaboration | ICT governance | Information | Learning |

*following them through where they occur, and remaining in step with the rhythm and life-blood of the local communities and their politicians.* (p. 36)

This is an appropriate maxim for action instead of analyzing the state of development of e-government to determine where more and better online services are offered.

## Profiles of Best Practice in Local E-Government

The second study mentioned here is the analysis of 50 cases of e-government in seven countries (Drüke, 2005) according to ten success factors for local e-government. This set of success factors covers the following aspects: vision and strategy, organization, applications, cost/benefit, technology, competence and qualification, acceptance and marketing, cooperation, sustainable resources, and legality.

The municipalities of the leading group of countries[3] (i.e., Finland, the United Kingdom, and the USA) have considerable agreement especially in the success factor "Guiding principles and strategy" and, to a lesser extent, in the success factor "Organization, project, and change management."

- The project is based on comprehensive guiding principles
- It is integrated into a comprehensive strategy
- It is controlled and steered with professional project and change management, *ex-ante*, *in-progress* and *post-mortem* evaluations and modern cost-benefit assessments

The central figures are the mayors as the political representatives and the city managers, who manage the public administration in a similar way to the chairman of the Board of Directors in private enterprise.

Another common element is the great importance given to "co-operation and partnerships," which is especially strong in Finland and the United Kingdom. Long-standing experience with co-operation and competence in coordination management has existed for many years because there is a tradition of openness to private business. Countries such as France and Japan have much ground to make up in this area.

Almost unanimously obstacles and hindrances have been specified. The items that, regardless of the country, were mostly named are:

- Lack of financial resources due to budgetary constraints
- Gaps in the set of qualification required to work with new technologies and work systems
- Staff resistance to change
- Management resistance to new role pattern
- Traditional stovepipe approach resulting in a lack of departmental collaboration
- Lack of regulation especially to assure security and privacy
- Uncertainty about the return on investment

As a result of this evidence a universal best-practice-core can be identified characterized by a high performance with regard to the factors political leadership, project organization, cost/benefit-assessment, co-operation and e-skilling. The first group is made up of the Anglo-Saxon countries (i.e., the United Kingdom and the USA) which treat the "city as an enterprise" more than other countries and regard e-government as a further instrument to mobilize the forces of the market. This is especially reflected in the priority given to customer orientation and the demands made on the effectiveness and efficiency of local community activities. The differences between the countries in the study are particularly large in the success factors

The importance that is being laid to the factors that determine the best practice: "Guiding principles and

strategy," "Organization, project, and change management," "Competence, motivation and qualifications," and "Co-operation and partnerships" and "sustainable provision of resources" characterizes the approach towards modernization of the public sector in the Anglo-Saxon countries[4] and, to a lesser extent, Finland.

## E-Government Good Practice Framework

The e-government good practice framework (GPF) which is being worked out on behalf of the EC, DG Information Society and Media[5], has three clearly defined targets:

- Define a description template and assessment criteria for good practice cases in e-government
- Collect examples of well-defined e-government cases
- Make the examples available for those involved in e-government by means of an intelligent knowledge database

The task, then, is to offer expert know-how on general or special e-government features and providing easy access to existing communities or expertise centers and to support the sustainable transfer of good practices and learning experiences in an easy and helpful way.

At present 364 members are registered in the GPF, the Web site contains 96 cases. Per day at about 10,000 hits are counted (average for August 2005).

## Best eEurope Practices (Beep)

The project having started in February 2001, officially ended on July 31, 2003 but work is continuing (homepage last updated August 5, 2004).

Beep is an accompanying measure in the European Commission financed Information Society Technologies Programme, which has developed a unique and comprehensive database of good practice. The project collects, analyses and refines good practices (best practices) in a variety of socio-economic area, by collecting case studies (almost 300) and coding them to a wide variety of indicators. In that endeavor Beep collaborates with a large number of organizations, at international, national and regional levels.

The commitment of existing partners will ensure that the beep knowledge system will continue to be updated, upgraded, and, where relevant and where opportunities allows, extended, for at least two further years with or without commission funding.

The beep knowledge system contains detailed case reports with advanced search facilities on the use of ICT to promote, among other things, especially e-government. All in all, 32 of the 316 cases are relevant to e-government in the Information Society. The final project report was published in September 2003[6].

## Research Report "Reorganisation of Government Back-Offices for Better Electronic Public Services: European Good Practices"

The report[7] presents and analyses the detailed results of one of the first studies at European level to systematically research how public agencies are using ICT to reorganize, ant the impact this has upon how electronic public services are experienced by citizens and business—in other words, on the changing relationship between the front and back office. The study is sponsored by the European Commission as a "benchmarking" exercise to support the eEurope and Lisbon Strategy processes.

It attempts to fill the yawning gap left to date by most attention being focused on documenting the roll-out of electronic public services, but very little focused upon how government, its various agencies and (back) offices, is, or should be, adapting and reorganizing to meet the challenges and opportunities presented by ICT.

This study attempts to fill this gap by drawing upon a large scale survey across the EU Members States (plus Iceland, Norway and the European Commission itself) based upon eEurope's common list of 20 basic public services, culminating in 29 in-depth case studies.

## eEurope Awards

The eEurope Awards are organized by the European Institute of Public Administration with the support of the Information Society Technologies Programme of the European Commission for the years 2003-2005[8]. The eEurope Awards recognize innovative initiatives in the areas of e-government and eHealth within Europe.

The four eEurope Awards distributed in the years 2003-2005 are intended to be a driving force in identifying and promoting excellence and creativity in the public sector with a view to supporting the mutual recognition and adoption of best practices. The eEurope Awards aim to highlight and disseminate efforts made by European national, regional, and local administrations in using information society technologies (IST) in order to increase efficiency and performance and to improve the quality and accessibility of public services.

The goal is to promote best practice among the Member States of the enlarged EU, the candidate countries as well as the EFTA countries. The best applications are selected for exhibition at a high-level conference on the topic. The most outstanding applications presented at the

conference are awarded with the prestigious eEurope Awards Trophy.

## TRANSFERABILITY OF BEST PRACTICE

If such a universal best practice can be identified the question is if this best practice can be transferred to other public authorities or, vice versa, be adopted by the less-performing authorities.

The result of our discussion of the two dominant theoretical concepts on the issue of change of institutions was that the improvement of an authority's performance in e-government is not the result of the free choice of rationally acting individuals but depends on structures, choices of the past and attitudes of the institutions' members. It makes sense to distinguish between objective and subjective factors that determine the transferability of good or best practice and, vice versa, the ability of an institution such as a public authority to adopt best practice.

The most important objective factors are:

- *IT infrastructure, Internet penetration* in the population and the world of work, general computer literacy, the existing legal framework, qualification structures, and traditions (cf. also Booz, Allen, & Hamilton, 2002): these factors describe the state of e-readiness (i.e., the general level of implementation of the information society in a country as a basis for e-government)
- *Degree and structure of institutional compatibility.* (Administrative structure, distribution of competence in the administrative structure between central and decentralized levels, remuneration and career patterns) (Scherrer, 2001; Soskice, 1994). The transfer of good practice between countries is comparatively easy if they are similar in their fundamental institutional structure, like the Anglo-Saxon countries on the one hand or countries with a federal constitution and similar administrative traditions such as Germany, Japan, and Poland on the other hand. But if the good practice examples are very closely linked to the basic institutional and cultural structure of one country, they are difficult to transfer to other countries. Conversely, if the institutional structure in the countries is very rigid, it will be difficult to apply the good practice examples. A striking example of this is the narrow limitation within which career patterns, payment, recruitment and staff deployment can be transferred from the United Kingdom or the USA to Germany, with its very specific public service employment laws. Thus, a country cannot leave its own modernization path at will and freely choose to adopt a different model
- *Size, composition, structures, level of regulations and active participants in major markets (software industry, telecommunications, employment market*) (Porter, 1990). The necessary active participant structure for local e-government on the supply and demand side will not develop in closed markets. For example, there will be a lack of creative software companies to implement the large number of specialist departmental procedures for online services
- The *overall strategy* in relation to administrative modernization and e-government. The criteria here are the coherence of the strategy in the top leadership of the federal state and the local communities, and also the degree to which the process is coordinated with administrative modernization (Eifert, 2005)

The yardstick for all of these factors is how closely or loosely they are connected with the special national characteristics and how coherently they fit together. Consequently, they form a system from which individual blocks cannot be removed and changed in isolation. They form a national innovation system (Dosi et al., 1989). "The strength of every successful production system lies precisely in its integration into conventions which work coherently in their interaction [...]: these elements cannot be mixed and joined à la carte." (Storper & Salais, 1997, p. 172)

A relevant factor explaining the differences in the approach to and the realization of local e-government is the specific administrative structure. The sample comprehends diverse countries such as the unitary states the United Kingdom, France, and Japan on one side and federal countries such as Germany, Finland, The Netherlands, and the USA.

To some extent, the differences are very noticeable at the local level, and they can be either beneficial or detrimental. This in turn points to the different structural, institutional, and cultural characteristics especially in the state constitution, labor legislation, vocational training and administrative traditions (Hollingsworth et al., 1994, Naschold, Oppen, & Wegener, 1997) that hinder other countries to easily adopt this managerialistic approach to public authorities. Two extremes for the significance that the administrative structure and/or the national strategy towards local e-government play are given to illustrate the role of national differences.

One extreme is Japan. No significant differences were identified in the characteristics of local e-government. One striking element is the strong central control of local e-government projects by the central government.

*The local e-government initiatives in Japan follow the e-Japan Strategies. Under the powerful navigation and abundant financial support extended by the national government, the pioneering local governments serve as the "model" to proceed with the pilot project, which are expected to be followed by other local governments. Accordingly, the majority of the local governments which are not yet developing the remarkable local e-government initiatives to date may be in the process to accept the policies and measures suggested by the national government, duplicating the preceding cases.* (Fujita et al. in Drüke, 2005, p. 197)

Japan offers a special reason to delay local e-government initiatives: the impending reform of local authorities, which involves merging municipalities.

*The municipalities with the perspective for the potential merger in the near future are taking the wait-and-see approach as they concern that the system should be restructured upon the merger, if it happens, even if they make the major e-investment at this stage.* (Fujita et al. in Drüke, 2005, p. 201)

The other extreme, The Netherlands, illustrate the consequences of a distinct localism in the state organization fort he implementation of local e-government.

*The problems of Dutch e-government development begin with the questions of policy, steering and central coordination. The Ministry of the Interior and Kingdom Relations seems to be made for this part, but operates within the constitutional make-up of [T]he Netherlands in which the Dutch governmental culture, which acknowledges the autonomy of the different layers and sectors of government (ministries), plays an important role. In practice this results in little room for centralized policy making. In [T]he Netherlands it is felt that e-government development requires voluntary participation and consensus among the different participants, making it a typically Dutch syrupy process, the famous "*Poldermodel*."* (Leenes & Svensson in Drüke, 2005, p. 151)

The result of this voluntarism is the lack of coordination and, thereby, a constant re-inventing the wheel by some progressive municipalities.

*Many municipalities are developing online services for what are basically very similar products. This seems not only inefficient, but given the limited resources most municipalities have their disposal, it is also a slow and cumbersome process. When municipalities realize the amount of effort needed to do a proper job, they may even throw in the towel, and wait for better times.* (p. 153)

The problem here is that the state in The Netherlands cannot correct market failure (see Porter, 1990) that is related to a lack of company presence on the market or to information uncertainty for the market actors. The state himself is shivering in terms of responsibility and competence and therefore more of a problem than part of the problem solution.

In addition to the objective factors, so-called subjective factors play a major role in deciding whether there is a successful transfer and adoption of best practices in e-government if the analysis of the objective factors indicates that this is desirable. The subjective factors thus describe the action-based factors.

The major subjective factors are:

- *Attitudes towards the state and state actions, willingness to reform and receptiveness to new ideas* in the population and the civil service. With a high level of risk avoidance among decision-makers and in the population, an ambitious project such as the introduction of e-government will fail
- *The state of procedural competence,* that is, the implicit and sub-conscious rules of social and political life, which are different from the formally fixed rules of a society in the form of laws and statutes (Scherrer, 2001). These tacit rules may play a significant role in causing sub-optimal solutions and concepts to be followed even though other solutions have been shown to be superior. The resistance to reforms which is frequently encountered and the stubborn persistence of established patterns are often associated with a strong influence of a deep-rooted procedural competence
- *Transfer and adoption capabilities* in areas such as management, motivation and leadership ability and practical skills such as language competence, networking, inter-cultural competence (Bartlett & Ghoshal, 1989). This factor decides whether this process can, in fact, be initiated and carried out, even if the people involved assent to the necessity of adopting good practices and the opportunities involved in the transfer. Elements involved include the ability to analyze the starting position in the adopting country and the target country, the selection of partners, setting up relationships of co-operation and practical supervision of the processes in the participating countries. It is very important to take the above subjective factors into account in this process

Elements of new institutional economics (especially in compiling the objective framework conditions for transfer) and path-dependent approaches such as "attitudes" and "implicit rules" obviously play a major role in this theoretical approach. The practical benefits can be seen in a model procedure used to determine the transfer potential.

There is another decisive aspect to avoid misunderstandings in the process of transferring and adopting solutions. This process will not be purely functional and technical in nature.

On the one hand, there are internal power constellations on both sides which have a decisive effect on the question of which countries are involved in which processes, what their interests will be and what the results will look like. Internal political interests and power constellations even affect the question of which country an "adopting" country is willing to receive solutions from. In the words of Scherrer (2001): "Existing power positions influence the possibilities for discourse and interpretation in relation to a foreign model" (p. 13) (i.e., the question of which country with which institutional structure should be considered as a model for the solution of the problems in the receiving country).

In this connection, the role of elites is rightly pointed out. They play an important role in interpreting the situation within their own country, and they also play a significant role in contacts between countries, partly because of their professional internationalism and partly because of their educational advantage which gives them greater access to information and greater credibility in interpreting this information.

On the other hand, power constellations also affect the relationship between the country transferring the solutions and the country adopting the solutions.

*The weaker country will be more willing to learn than the stronger country. This is not only because the apparent success of the stronger country makes it more attractive. The stronger country, or its major active participants, can also mobilize greater resources and incentives to promote the adoption of their institutions.* (p. 14)

The instruments of power naturally include money, for example in the award of subsidies for the penetration of foreign e-government settings by a country's own experts, then influence, for example in the allocation of roles in international committees, which can be increasingly significant in e-government due to the growth in international co-operation, and finally preferential treatment in the formation of coalitions in international negotiations (e.g., on questions such as standardization, interoperability, and international e-government services).

## FUTURE TRENDS

The pressure to improve the quality and performance of public administration is secular, global, and irrevocable. That holds true for the developed countries as well as for the countries in transformation. The interest in studying good practices holds unbroken. Conferences, books, and journals provide broad space for discussions, analysis, and illustrations of good practices respectively what is regarded as good or best practice. What is prevailing is a tendency to learn good practice as there are that means without taking into consideration the institutional, cultural, political, and societal background that a practice is embedded in. A "paste-and-copy"-approach towards good practice is dominant.

## CONCLUSION

To lead a best practice discussion is very practical and very reasonable. Decision-makers are eager to improve the performance of their institution to better cope with the increasing complexity of their surrounding. In times of severe criticism of the performance of public authorities, the pressure for change is increasing. Before this background, it is more than understandable that those individuals that have the responsibility to handle with public money look for solutions for their problem. For reasons that have been discussed here the adoption of a best practice-model in e-government cannot be the royal route. Institutions are too complex, too diverse, and too embedded in their surrounding and their history to be changed according to a one-size-fits-all-model from teaching books on institutional performance.

The analysis of some empirical research on good practices in e-government (Drüke, 2005; Socitm/I&DeA, 2002) made clear that there exists a set of factors that are indispensable for a public authority to be a good performer. Taken from the studies on local e-government the characteristics of a best practice in e-government are: the clear and practical commitment from the political leaders, strong and professional project organization, a cost/benefit assessment, co-operation, and e-skilling.

These factors build up a universal best-practice core insofar they are not deeply linked to the institutional structure of a nation. It is comparatively easy to adopt them to the institutional setting of a nation.

The decisive question, therefore, is not to understand what it takes to be a better performing public authority but to have a clear understanding of the fostering and hindering conditions in a change process. Any change program will affect interest constellations and power distribution that are hard to modify. The challenge is to set up a change

process that integrates the interests of major stakeholders, of the employees' and satisfies the customers of public administration rather than to look for recipes coming from best practice books.

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## KEY TERMS

**Best-Practice-Model:** The assumption that there can be a generally valid concept of modernization with goals that are defined by a best practice model. This model would be an increasingly trans-national development model for the public sector

**Managerialism:** The concept to regard public authorities as enterprise-like institutions. In fact, this notion neglects the structural differences between private companies and public entities that go along with the public law, with the separation between state and society and with the role of the state as the sovereign.

**One Best Way:** The one best way theory regards the adoption of superior concepts as the royal route to overcoming existing inadequacies. Public authorities are bound to adopt this way or to continue to be less-performing.

**Path Dependence:** The theory of path dependence sees hardly any possibility to adopt solutions from other national environments—it considers that the bonds of the decisions of the past and inherited structures are too strong. So, this concept restricts learning to the inner potential of an organization. In that perspective learning takes place if actors consider the inner potential of a choice, an institution as being limited

**Political Commitment:** The concept that change processes have to be backed and led by the highest authority in an institution. For public administration it is even more important as the whole of the role of state, the concept of public administration as such is at stake.

**Success Factor:** An element or a factor that determines the success of a change management process. In the field of e-government success factors are those factors that must be regarded when setting up e-government on local, regional, or national level.

**Virtual Town Hall:** The local online public administration as an additional "existence" next to the real town hall. The notion expresses the development state of a local public authority where the services that can and should be offered online have been implemented. In addition, the notion hints at the comprehensive character of modernization in the sense of a deep going restructuring of the way public administration works.

## ENDNOTES

[1] See the discussion about the supremacy of the "Model USA" (cf. Block, 1991) or the discussion

about to copy "The Japanese production system" (cf. Womack et al., 1990) and in public administration the need to follow "The model local community of Christchurch" (cf. Pröhl, 1997)

[2] The project KEeLAN (Key Elements for Electronic Local Authorities' Networks) also examines the Web services of a number of cities and local communities for their quality, their range for the users and the integration of online services. The aim of the KEeLAN project is to establish suitable methods and principles for forward-looking action in local community and regional administrations. To this end, 700 local empirical studies were then used to develop "road maps" with recommendations for local community action and strategy.

[3] Obviously, there are other well-performing countries such as Canada, Sweden, or Estonia.

[4] This result is quite known: It is relevant to note in this regard that NPM-type reforms succeeded best in countries with broadly congruent cultures and institutional frameworks propitious for the task, but also with affinity to those of the country of origin (e.g., Anglo-Saxon countries)" (UN, 2001, p. 59)

[5] EU-Commission (2005).

[6] http://www.beepknowledgesystem.org

[7] Millard et al. (2004)

[8] http://www.eipa.nl

# Business Process Redesign in Implementing E–Government in Ireland



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## INTRODUCTION

Competitive pressures and improvements in information technology constantly force organisations to re-evaluate their business strategies (Porter, 2001; Venkatraman, 1994). Although public-sector organisations may not operate in a competitive environment, changes in management philosophies are causing public-sector organisations to think and act more like private-sector organisations (Gulledge & Sommers, 2002). Electronic government is one means by which governments can offer more effective and efficient services (Layne & Lee, 2001).

This article investigates the evolution of e-government in Ireland. A case study is presented detailing how the Irish government's e-government strategy was devised and implemented. The success of this implementation yields valuable insights into the identification and management of critical concerns during the evolvement and attainment of business-process redesign in e-government. Cumulatively, these lessons provide a road map for the successful attainment of citizen-centric e-government.

## ELECTRONIC GOVERNMENT

Electronic government consists of using technology, particularly the Internet, as a means to deliver services to citizens, businesses, and other entities (Tambouris, 2001; Watson & Mundy, 2001). E-government has the potential to transform not only the way in which most public services are delivered, but also the fundamental relationship between government and citizen (Burn & Robbins, 2001; Watson & Mundy). Operational benefits of e-government include continuous availability of service, a reduction in response time, and a reduction in error rate (Al-Kibisi, de Boer, Mourshed, & Rea, 2001). These factors contribute to an increase in the efficiency of government (Coulthard & Castleman, 2001; Dearstyne, 2001; Lagroue, 2002).

Through the use of information systems, organisations are challenged to redesign their processes in order to achieve the benefits of increased efficiency, cost reductions, and better customer service (Glassey, 2001; Warkentin, Gefen, Pavlou, & Rose, 2002). Governments can also use technology to improve core business processes (Coulthard & Castleman, 2001; McAdam & Donaghy, 1999).

### Business-Process Redesign

Organisations are required to produce at a low cost, with high quality, and with fast and flexible responsiveness to customer needs (Venkatraman, 1994). This puts pressure on organisations to redesign the way in which they conduct their business and build information systems to support new processes (Venkatraman). Out of such pressures was born the idea of business-process reengineering (BPR; Davenport & Short, 1990; Hammer, 1990). The key aspect of BPR is the fundamental and radical redesign of business processes to achieve dramatic improvements (Hammer & Champy, 1993). The lessons learnt from the BPR era served to inform management that less radical, more holistic, and more incremental changes to business processes were required (Guha & Grover, 1997).

Venkatraman (1994) identified five levels of IT-enabled business transformation. The central thesis of Venkatraman's work is that only marginal benefits will accrue from superimposing IT on existing organisational conditions. This is illustrated by the first two levels of Venkatraman's model (Figure 1). These levels, according to Venkatraman, are evolutionary as they require only minimal changes to business processes.

*Figure 1. Alternative Approaches to BPR (Venkatraman 1994)*

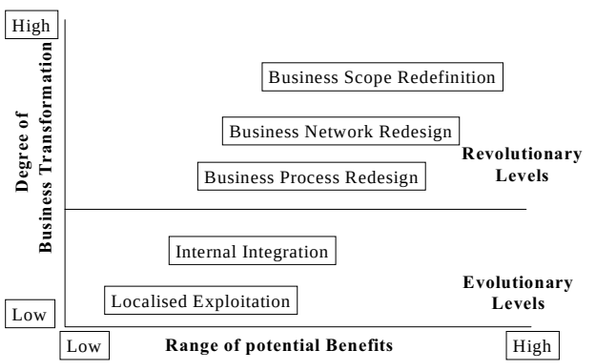
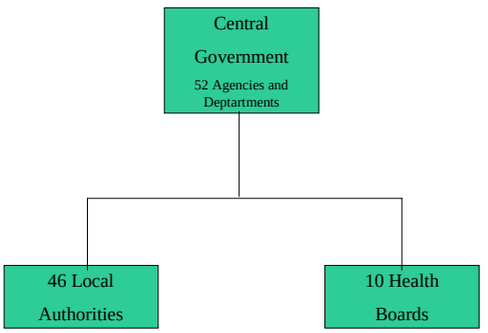



*Figure 2. Structure of government in Ireland*




The top-three levels are revolutionary as these levels require radical change to existing business processes. An organisation could redesign its processes and then go on to redesign its network, stretching beyond the organisation, and ultimately redefine the scope of the organisation.

The organisation moving up the framework is seeking efficiency. Initially, this begins with localised exploitation and then moves up to internal integration. As the organisation moves up each level, the range of potential benefits increases. However, each higher stage requires a greater degree of organisational change. Eventually, in order to achieve more dramatic results, it will need to move up to the first revolutionary level and engage in business-process reengineering.

## RESEARCH METHODOLOGY

This research is exploratory in nature and seeks to investigate the extent to which business-process redesign was instrumental in the movement to e-government in Ireland. The Venkatraman (1994) model of IT-enabled change was adopted as a framework for the research.

Five in-depth interviews were conducted with three government agencies involved in the e-government project. An in-depth interview was conducted with one senior civil servant from the Department of An Taoiseach (prime minister), the governmental department providing strategic leadership to e-government initiatives in Ireland. Two in-depth interviews were conducted with members of REACH, the executive body created specifically to implement the e-government strategy. In addition, further interviews were conducted with two senior members of the Local Government Computer Supply Board (LGCSB), a public-sector company providing IS services to local government.

These interviews were conducted on-site in April 2002. All interviews were semistructured and lasted approximately 2 hours. The interviews conducted with all participants were supplemented by access to internal documentation. Records were kept of the content of all interviews. Further clarifications and updates were obtained by e-mail and telephone contact.

## E-GOVERNMENT IN IRELAND

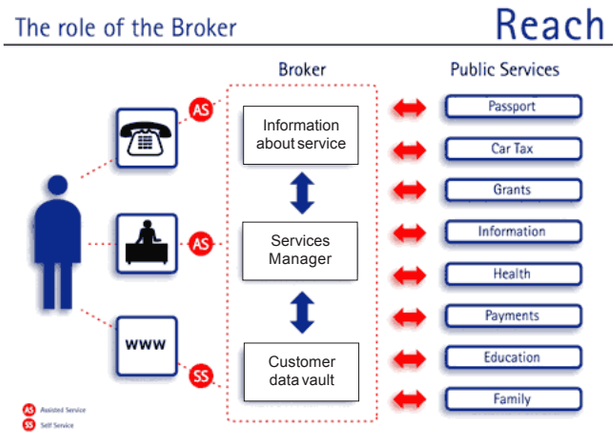
Government in Ireland is conducted at two tiers: the national and local levels as depicted in Figure 2. Central government consists of 17 government departments and 35 agencies, while local government consists of local authorities, with 46 currently in operation, who are responsible for the provision of a variety of government services at a local level, and 10 health boards who are responsible for administering health services.

### IS Support for Government

IS support at both the central and local level is provided through a combination of in-house expertise, outsourcing to the private sector, and LGCSB. LGCSB is a public-sector company whose objective is to provide local authorities with IS systems and expertise on an individual basis.

In response to local-authority requests, LGCSB developed electronic forms (e-forms) for use on local-authority Web sites. These forms were Web versions of the traditional paper-based form. Users could register with their local authority, but there was no online system in place either to process the form electronically or to authenticate

*Figure 3. The public-service broker (REACH)*




the individual. These initial e-forms served only to promote the accessibility of public service forms through an electronic medium.

## Road Map for E-Government

In January 1999, the Irish government released its first action plan on the information society. The plan outlined a three-strand approach to the online delivery of public services: information services, interactive services, and integrated services. Government departments were required to implement Web sites, and the OASIS (Online Access to Services Information and Support) and BASIS (Business Access to State Information and Support) projects were initiated. These Web sites were to be designed to meet the entire informational needs of a client regardless of the source of the information.

Toward the end of 2000, the REACH agency was officially established, its name reflecting the concept of government reaching out to its customers. REACH is an executive body with the responsibility of coordinating the central agencies responsible for implementing the e-government strategy and providing management of the overall e-government initiative.

Initially, REACH was composed of 11 civil servants drawn from a variety of departments and established as an independent unit within the Department of Social and Family Affairs. The concept of a portal-based public-service broker (PSB) was adopted by REACH as the central mechanism for delivering the e-government agenda.

The framework for the PSB, as depicted in Figure 3, consists of three features: integration, multiple access channels, and data security. First, the PSB will provide a single point of access to all services of both central and local government. The revolutionary aspect of the PSB is that service is to be provided from the customer's perspective. That is, the customer interacts with the broker and not the actual service provider. Second, the PSB will make services available through many access channels; these include online self-service, telephone contact centres, and one-stop shops. Finally, the PSB will provide a customer data vault that will store data relevant to their interaction with the government. This data will be used to facilitate online transactions, provide personalization of the user interface, and provide various other aids in form completion.

## Implementing E-Government

In November 2000, the OASIS (http://www.oasis.gov.ie) and BASIS (http://www.basis.ie) Web sites were launched. These Web sites provide detailed information on government services to citizens and businesses, respectively. With a focus on customer requirements, these sites broke the long-standing tradition of distributing government information along functional lines.

During 2001, REACH, in partnership with LGCSB, developed an interim-level PSB. LGCSB was identified as a technical partner for two reasons. First, LGCSB had gained significant expertise through the implementation of e-forms, and second, local authorities had a tried and trusted relationship established with LGCSB.

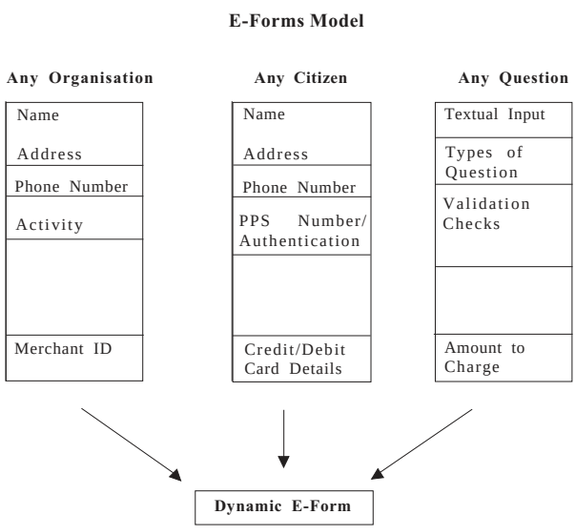
This interim service became known as Reachservices and was officially launched in April 2002.

Also in April 2002, the second government action plan entitled *New Connections* was published. The main objectives of the e-government strategy were outlined as a radical improvement in quality of service to customers, major improvements in administrative efficiencies, and enhanced control of publicly funded services. The government also made a commitment to have all public services capable of electronic delivery available through a single point of contact by 2005. By 2006, the PSB progressed through a procurement process and has been outsourced to a private-sector firm where it is currently under construction.

## Meeting the Challenge of Delivery

The main challenge in the development of Reachservices was to have every local authority's paper-based forms available online for electronic download and submission. Each of the 46 local authorities had at least 133 forms that they required to be individually customisable. This resulted in a total requirement of more than 6,000 forms, excluding health boards. To meet this require-

*Figure 4. Representation of form-builder application (LGCSB)*




ment, LGCSB developed a centrally administered system that would allow each local authority access an electronic form builder.

The form-builder tool has a graphical user interface and is based on the idea that a generic form can accommodate any organisation for any citizen and cover any question (Figure 4). The form builder is based on three basic entities: the organisation, the individual, and the question. It enables the local authority to create its customised form that is then uploaded onto the Reachservices site.

## Process Redesign

The implementation of Reachservices necessitated changes to traditional processes. These changes occurred in three areas: the publication and distribution of forms, citizen identification and data security, and the completion and submission of forms by citizens.

Central to the progression of the online service provision achieved by REACH was the redevelopment of e-forms into the form-builder tool accessible to the local authority through the portal Reachservices. The local authorities are allocated a user name and password, allowing them access to the form builder. Each local-authority administrator can then select which e-forms are to be made available for the authority and can customise those forms online. From a template form, the administrator creates the questions, defines what type of response the user will give, and can add whatever validation checks or mandatory fields that are required.

Another significant advance achieved by Reachservices is citizen identification. Before using the system, the individual must register with Reachservices. Part of this registration is an authentication process that is managed by the Department of Social and Family Affairs. The individual may then access the Reachservices site using their Personal Public Service (Social Security) number and password. This is an essential feature of the process as it provides the authority with proof of the individual's identity and enables features like intelligent form filling. Personal data is then stored in a data vault. All authorities have access to the data vault; however, the citizen retains the right to determine which authorities have access to their individual information. Thus, the system complies with current data protection and privacy legislation as the individual citizen decides what information, beyond the statutory minimum, is shared with whom.

With respect to form completion by the citizen, intelligent form filling allows certain fields to be populated automatically based on the information stored on each citizen. It also allows for certain questions to be deactivated when they are not necessary. The user is also provided with the capability to save a partially completed form for completion at a later date. When the user submits the form, it is automatically routed to the relevant authority in XML (Extensible Markup Language) format. At present, the front-end interface is fully automated while the back-end system still relies on human interaction.

## FINDINGS

The e-government strategy was devised and ratified by the highest possible level of central government. REACH identified and exploited the technological expertise of LGCSB and successfully procured a partnership with the Department of Social and Family Affairs in order to provide an authentication service. The effective management and coordination of otherwise autonomous stakeholders, combined with the right technical infrastructure, provided the ingredients for the provision of a successful public e-service.

Process changes occurred within local authorities and health boards with respect to form publication and distribution, and in the acceptance of electronic submissions. Responsibility for citizen identification was shifted from the service provider to the Department of Social and Family Affairs. This also facilitated the introduction of a single repository for citizen data.

The immediate impact to citizens can be judged in terms of ease of access, ease of use, and efficiency.

*Table 1. E-government initiative compared to Venkatraman framework*

| Venkatraman Stage | E-Government Initiative |
|---|---|
| Localised Exploitation | Development of local authority web sites with PDF forms. |
| Internal Integration | Launch of OASIS and BASIS web portals, availability of e-Forms on local authority sites and the establishment of REACH |
| Business Process Redesign | Partial process redesign though the use of Reachservices form builder application, citizen identification and online access |
| Business Network Redesign | Establishment of interim Public Service Broker Reachservices. |
| Business Scope Re-definition | Strategic thrust from agency centric to citizen centric services |

Providing a multitude of forms from individual authorities in one location gives citizens ease of access resulting in time savings. The completion of a form is greatly simplified through intelligent form filling. The Reachservices Web site went live in mid-April 2002 and was launched without the use of advertising in order to prevent an initial surge of activity. Nonetheless, the initial uptake rate was approximately 500 to 600 registrations per month during its first few months of operation, and the total number of registered users currently stands at 1,500. This volume of traffic was regarded as successful due to the subdued launch and the fact that the site only offered a fraction of the functionality ultimately intended.

Reachservices has had a 100% uptake rate by local authorities, albeit some authorities are implementing at different levels. There has also been a very high take-up rate amongst the health boards, although not 100%. The case also highlights a more subtle yet profound observation. The Reachservices infrastructure and the future PSB are to be developed around the existing government structures. In other words, due to political considerations, a full and complete process redesign will never be possible as the existing authorities must remain in place. Thus, a complete understanding of the intricate and sometimes bureaucratic processes that combine to form citizen services is necessary so that it is possible to identify the process or elements of processes that can be redesigned, automated, or left unchanged.

However, this interim portal highlights the transformation stages that need to be managed in order to deliver any level of e-government. Table 1 compares the e-government achievements in this case with the Venkatraman (1994) framework.

The development of local-authority Web sites represents the occurrence of localised exploitation that is the implementation of IT within a business typically at a functional level requiring little process change. However, the subsequent move to restructure information from a user perspective through the OASIS and BASIS Web portals represents internal integration as this is characterised by a systematic attempt to leverage IT capabilities. The establishment of REACH also illustrates the commitment of senior government officials to the attainment of an integrated and coordinated approach to e-government.

Participation in the Reachservices portal required local authorities to make significant changes to specific elements of their service delivery process: the publication, distribution, and electronic acceptance of forms, and the storage of citizen information. Participation also introduced a new process of citizen identification in which the local authority was a passive participant. Finally, participation also enabled electronic access to services, although this required almost no process change as the actual service itself was still conducted in a traditional manner with the citizen receiving electronic or physical notification of service completion.

Government by its nature is a collection of businesses (agencies and departments), and the development of the Reachservices platform represents the attainment of business-network redesign as the platform radically impacts the nature of the exchange among multiple participants through new IT capabilities. Individual authorities that traditionally operated independently began to participate in a centralised mechanism. The Reachservices platform instigated the move toward electronic information sharing that was capable of supporting seamless interconnectivity, process linkage, and knowledge management.

Finally, business-scope redefinition was manifested by the strategic shift in government policy toward citizen-centric services that are enabled by a public-service broker. Thus, the government was redefining its business role from authoritative redistributor to service provider.

## CONCLUSION AND FUTURE TRENDS

This case provides valuable insights into how citizen-centred e-government can be attained and highlights the

central importance of managing processes and process change in the implementation of e-government. The Reachservices business network connects local and central systems through the use of a centralised database that maintains the authenticated data of the individual citizen. However, Reachservices does not provide sufficient functionally to facilitate the provision of a comprehensive set of services, and thus, while serving as a successful example of a move to e-government, it falls far short of a true citizen-centric e-government platform.

While the case provides strong evidence that the infrastructure for the PSB will be developed, there is a marked absence of focus on the core process. Almost the entire effort of the REACH agency has been on the provision of the technical infrastructure. While REACH has proven that the local authorities are willing to participate in such a network, it has not proven that these authorities are willing or capable of implementing more radical process change.

Business-process redesign has been limited and as such, this case provides evidence of the existence of the gap identified by Venkatraman (1994) between the evolutionary and revolutionary means of business transformation. The model of business transformation proposed by Venkatraman represents very well the process as it actually occurred in this case. In order to move from an evolutionary to revolutionary business transformation, a requirement to abandon existing systems in favour of new systems has been identified. The ability to identify and scope these new systems was in large part facilitated by the learning that occurred while developing the initial e-government initiatives: the evolutionary stages. In addition, the establishment of a specific government entity, REACH, whose sole purpose is to oversee and implement the e-government strategy, has contributed greatly to the success achieved to date.

REACH was in a position to both identify and manage the critical success factors involved in delivering e-government. First, the most appropriate model and technical infrastructure were identified and implemented by outsourcing to leverage expertise that already existed. This use of existing expertise proved highly successful in terms of developing a robust infrastructure within a limited time frame. Second, critical concerns of local authorities were managed by using familiar actors. Third, the interactions necessary between otherwise independent agencies was successfully coordinated to ensure the delivery of a quality service. Fourth, the maintenance of a customer focus by providing quality service through a single portal in which the citizen has control over his or her personal data contributed to a successful uptake of the system.

The case illustrates that e-government initiatives that fit within the evolutionary classification can be achieved in a timely and successful manner. The case also illustrates that more revolutionary initiatives are achievable, but that the development of these initiatives beyond basic services requires sophisticated business-network and business-process redesign.

Thus, an important area for further research is to investigate the unique nature of processes within the public sector so that IS platforms can be developed that accommodate less efficient processes rather than platforms that require unobtainable process redesign.

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## KEY TERMS

**Business Process Redesign:** IT-enabled business transformation, or the fundamental and radical redesign of business processes to achieve dramatic improvements.

**Citizen-Centred E-Government:** The development of a client-based approach focusing less on traditional bureaucracies and more on customer attitudes, with the objective of providing services to citizens based on their needs and being accessible from a single point of contact.

**Digital Divide:** The digital divide is defined by the "gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities" (OECD, 2001).

**E-Government:** Electronic government consists of using technology, particularly the Internet, as a means to deliver services to citizens, businesses, and other entities.

**Electronic Service Delivery:** The provision of services with the assistance of telecommunications and telecommunications-based tools. A range of access methods are available to service users, for example, the Internet, phone, and walk-in counters.

**Integrated Services:** Integration is required on two levels. First, the services that are presented to citizens should be offered in a citizen-centric manner whereby the orientation of information is focused on the customer and not on the service. Second, the underlying processes require functional integration, where services in one department will support or trigger the provision of service in another area.

**Portal:** The provision of integrated services, combining personalisation features, via the Internet. The portal would act as the single point of contact for the delivery of citizen-centric services.

# Call Centre Evolution in the Digital Government

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## INTRODUCTION

Public administration is undergoing a radical transformation. Citizens, rather than administrative documents, will be the primary and active subjects of the process of service supply. A new attitude toward administrative service is emerging. Citizens interact with public administration through new channels such as *unified administrative counters*, *multifunction administrative counters*, *citizen liaisons offices*, and *Internet*. Furthermore, having in mind the goals of shortening the distance between citizens to public administration and improving efficiency and efficacy of public bodies, the use of *call* and *contact centres* is quickly spreading out. It is worth to recall the recent case of *Allô Service Public*, the unified call centre of the French public administration, which on its first day of activation has been contacted by more than 100,000 people, more than any optimistic expectation.

For a public administration, a *call centre* represents a simple way for interacting with citizens. Call centres provide many advantages such as improved efficiency, increased hours of operation, and reduced costs. The main advantage for citizens is that call centres can provide the information they need, as fast as possible and reducing waiting time.

Call centres and contact centres are based on an innovative use of the phone channel, on one side, and on multi-channel strategies of access to service and information, on the other side. The combination of these two aspects allows public administration to develop and activate new modes of managing interaction with citizens. A phone-based information service is often the first channel chosen by citizens that want to get in touch with a public body. Call centres, on the other hands, have a relevant role for implementing the link between *front-office* and *back-office* services.

## BACKGROUND

The call centre concept evolves through four main phases (Bagnara, 2000; Kowarsky, 1998).

### Phase 0

In the sixties, a call centre was a complaints office equipped with a toll free number. As the aim of call centres was to reply to standard complaints, human operators had a limited base of knowledge and basic communication skills. The first service of this kind was activated by Ford, as a consequence of a sentence pronounced by an American judge in 1968, in a lawsuit initiated by a consumer association.

### Phase 1

Around the mid-eighties, call centres adopted ACD (Automatic Call Distributor) technology. An ACD is a system to receive a large number of phone calls, especially optimized to equally distribute them to the available operators. At this time, human operators had a still limited, but now specialized, base of knowledge. In 1981, General Electric activated the so called "GE Answer Centre" with the aim of facilitating customers that need, or simply desire, to get in touch with the company. This centre quickly became a benchmark for all the other American companies with a large number of customers. Between 1984 and 1989, while many call centres were opened in U.S., General Electric activated 52 different call centres for its primary business divisions. The success of this new way of providing services to customers was so large that, in the eighties, more than 4 million job positions were created in the newly activated US call centres.

## Phase 2

In the nineties, call centres adopted the emerging Information and communication technologies, thus providing a service that fulfills the three major consumer's requirements: easy access, closeness, personal information. Under this perspective, the development of call centres is considered a basic opportunity to know and address customer's needs, rather than being an additional cost. The main business goal was to differentiate and increase the value of the company offers with respect to competitors. In this phase, human operators have high level communication skills.

## Phase 3

At the beginning of the new century, call centres are considered as places where new value is created both for a company and its customers. The technology used by call centres evolve, in order to provide a personalized service based on the phone and the newly available communication channels. Physical front desks, surface mail, fax, electronic mail, WAP (wireless application protocol) based interface, are channels simultaneously used to grant access to the call centre. Combining these channels with automatic and interactive phone answer systems, Web applications, and the like, the call centre becomes a sophisticated reference point. In this context, human operators play the role of specialized consultants.

# PUBLIC ADMINISTRATION AND CALL CENTRE

In the public sector, call centres have followed a more recent evolutionary path. The citizen liaisons office, a front desk entirely dedicated to communication activities, has been introduced at least ten years ago and has been used as the basis for the first public call centres. Starting from this kind of unidirectional channel (information are simply given upon a specific request), public administration has moved into a phase characterized by more interactive services to citizens.

The change of attitude towards this form of communication channels is due to two main factors: the commitment of public administrations to facilitate the interaction with citizens and private enterprises, the needs of citizens to obtain services with the same quality levels of those provided by the private sector, where call centres are already widespread. Furthermore, public administration is more and more interested in knowing citizen's needs as a concrete base for providing services that address real and concrete expectations (Call Centres in the Scottish Public Sector, 2001).

The goals of a public administration call centre are the following:

- To facilitate contacts between citizens/enterprises and public administration (removing physical queue lines, freedom to choose the preferred mode for getting in touch with public administration, chance to receive desired information in time frames different from the traditional ones) (Controller and auditor general, 2002)
- To improve quality level of relationships with citizens/enterprises by means of timely and trusted answers
- To standardize quality levels and contents of given answers, by means of trained, qualified, and motivated personnel and the fulfillment of high and predefined service levels (Baird, 2004)
- To gather and process information coming from citizens/enterprises, in order to improve and simplify internal procedures and organization
- To constantly enrich the amount of knowledge and competencies available in the public bodies, through sharing and spreading of given answers, best practices in the management of relationships between citizens and enterprises
- To improve and promote the external image of public bodies

In the actual scenario, the number of public bodies involved in innovative experiences based on advanced communication modes that integrate different channels such as phone, physical front desk, fax, electronic mail, Web, SMS messages is rapidly increasing. *Information quality* is the common factor of these initiatives. Information, in fact, is exchanged, processed, exploited in the transactions between citizens and public administration and among different public bodies (Bagnara, Donati, & Schael, 2002).

The other relevant issues are *usability* and *accessibility* of the services to citizens and *universal access right*. In some cases, these issues are handled by *Web call centres*. The feeling of loneliness and uneasiness induced by the use of Internet (or by automatic answering systems, as well) is reduced, or at least mitigated, by virtual front desks implemented with the current technology (Controller and auditor general, 2002).

# FROM WEB TO CONTACT CENTRE IN PUBLIC ADMINISTRATION

The Web call centre is a solution that allows Internet navigators to get in touch, through a vocal connection,

with a call centre operator and to get some support for navigation. Therefore, the Web call centre is the natural evolution of call centre services. Interaction with users becomes more dynamic, thus shortening the sense of distance from the public bodies that provides the service.

Users of a Web call centre visit a site and communicate with human operators by call-back, VOIP (Voice over IP), or chat. The Internet user can interact with a human operator in the following ways:

- **Click-to-Chat:** Through a button the user that is navigating inside the site can immediately activate a chat session with an operator.
- **Click-to-Call-Back:** The user reserves an automatic call-back from an operator, either in real-time or at a given day and time.
- **Click-to-Talk:** By using VOIP, the user can talk with an operator.
- **Collaborative Browsing:** This mode is normally integrated with click-to-chat or click-to-talk; the operator literally "drives" the user through the site, acting as if he or she were physically inside the user's computer.

The use of a Web call centre gives advantages both to the public administration and to its citizens/users. Administrations benefit from immediate contact with its users, elapsed time for handling requests is significantly reduced, management costs are cut down, and number of contacts can increase. Citizens can increase the level of knowledge of the administration, phone costs can be avoided since citizens are already connected to Internet, and a direct interaction with public administration is naturally developed (VoiceCom News, 2002).

For example, in the UK, call and contact centres are an increasingly important interface in the management of government relationships with the citizen and business. Often there are many call centres for each department. Actually call and contact centres are playing a pivotal role in meeting the government's target of complete electronic delivery of public services by 2005.

In the following, we present some example of international Web call centre.

- National Contact Centre of the Federal Consumer Information Centre, a single point of contact for people with questions about federal agencies, programs, and services, http://www.info.gov
- Rural Transaction Centre in Australia provides by e-mail or telephone both commercial and governmental services to people living in rural zones, http://www.dotrs.gov.au/rtc/index.htm
- MAXI of the State of Victoria allows citizens to execute online transactions and payments via Internet, by telephone, or through a network of public kiosks, http://www.maxi.com.au
- Service Tasmania provides a flexible access to the widest range of Web resources, primarily information and services from the state government, but also from the federal and the local governments, http://www.servicetasmania.tas.gov.au/
- Europe Direct is a service to help people to find answers to questions about the European Union. The call centre, free of charge for every member state, provides direct response to general enquiries and, in case of detailed questions, can forward the user to the best source of information and advice, http://europa.eu.int/europedirect/index_en.htm
- Allô, service public in France is a service of administrative information by telephone. A single telephone number makes it possible to obtain a response or an orientation with any administrative request for information. http://www.service-public.fr/accueil/renseignement_3939_oct2004.html
- SuperAbile, an Italian call centre that provides information on disabilities, http://www.superabile.it
- CallDtc (literally Call the District) of Canavese technological district is a remote consultancy service whose use is restricted to the employees of the local bodies on the specific subject of local government, http://www.canavese.to.it/pa/calldtc/default.asp
- Pubblicamente is a service to help people to find answer inquiries about local public administrations, http://www.pubblicamente.it

## PUBLIC ADMINISTRATION AND CONTACT CENTRES

A contact centre provides the customer support service not only through phone calls, but also by means of other communication channels such as fax or electronic mail to interact with users in a more and more direct and personalized way. Current implementations of contact centres are both integrating CRM systems and adding new functionalities for managing non voice interactions. These enhancements aim at shortening the distance between the contact centre and its users, in order to understand their needs and to facilitate their access to the available information.

The contact centre is a tool for:

- Activating relationships and processes towards the citizen/user, through a single and optimized contact point

- Integrating the organization and the information system
- Improving the quality levels of the contact centre, the provided services, and the managed knowledge base
- Coordinating net-learning and continuous training activities both for public administrations and citizens/enterprises

The contact centre aims at integrating specific professional skills available in the public administration with the purpose of addressing the specific needs of its users. Addressing these needs with specialist and precise competences is the main goal of a contact centre. Designing a contact centre corresponds, therefore, to the creation of an integration point for many different actors, where economical, social, territorial resources and citizens/enterprises meet the available services (Zetti, 2003).

## FUTURE TRENDS

Multi-channels communication gives all users, with different skills and socio-technological conditions, an equal opportunity to have access services provided by public administration. On the other hands, the administration can reach all its potential users in an efficient and effective way. For this reason, there is a trend to activate contact centres in public administrations to contrast the risk of creating a digital divide among citizens. The opportunities given by technological advancement would result in another vehicle of exclusion for a large part of the population.

Videoconference and video give a further opportunity to improve and expand the quality and the scope of public services. The goal of a *video Web call centre* is to virtually recreate the same level of confidence and friendliness that is peculiar to the direct physical contact, with the opportunity to extend this kind of contact to a larger set of users with much more reduced costs. This technology enables the user to talk with a human operator, sitting in front of a home computer, as if the operator were just in front of the screen. This channel is a strong approximation to the physical front desk interaction. The wide upcoming adoption of interactive TV and broadband Internet connections will make this communication mode more and more popular.

Up to now, the main difficulty that public bodies are encountering is the process of merging contact centres into the so called *service strategy*. Realizing a contact centre is a task that starts from the re-design and redefinition of the set and the nature of services provided to citizens/users.

## CONCLUSION

The adoption of a model of call or contact centre depends upon both the service strategies that an administration decides to actuate and the goals that it wants to pursue. These are the elements that allow the administration to make a weighted choice between a first level contact centre that provides a service of informative assistance and a contact centre of first and second level, where the first level provides information and forward the request of further details to the second level that provides more specialist information.

The choice of the reference model for the call centre is of paramount importance and depends upon some requirements that the administration has on the service management: how to plan the phases of the project for realizing the centre, what amount of financial resources are available. Besides the strategic choices there are other variables: organization (how to locate the contact centre inside the organization); competences, skills, and training of the required personnel; technological solutions and criteria for choosing the more appropriate one; monitoring of the service quality levels. This is also needed to avoid that the administration transforms the service design into a mere technical issue.

Generally speaking, the call centre and its development are one of the most significant tools for the evolution of e-government. From one side the call centre can decrease the needs of information, which rely on citizens. From the other side, it allows the administration to monitor citizen's needs, thus giving more effective and useful information. This triggers the request of innovation that can be obtained by investing in knowledge, innovative technology, training, professional culture, and development of the human factor. It is this last element the main resources, coupled with a new way of management and government (FITLOG, 2000).

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## KEY TERMS

**ACD (Automatic Call Distributor):** The specialized telephone system used in incoming call centres. It is a programmable device that automatically answers to calls, queues calls, distributes calls to agents, plays delay announcements to callers, and provides real-time and historical reports on these activities.

**Automatic Call Back:** A feature of a telephone system that allows a caller to hang up and instruct the system to call back as soon as a busy station or trunk is free.

**Call Centre:** An umbrella term that generally refers to reservations centres, help desks, information lines, or customer service centres, regardless of how they are organized or what types of transactions they handle. The term is being challenged by many, because calls are just one type of transaction and the word centre does not accurately depict the many multi-site environments.

**Co-Sourcing:** Supplying services in-house and with an outside company/vendor to handle some or all of a company's inbound and/or outbound telephone calls or contacts.

**Communication Server (CS):** Also CTI Server, PcPabx, Un-Pabx, CT Server, Contact Server. An integration technological platform that manages several communication resources. Also called ALL-IN-ONE when the CS incorporates functions of telephone commutation.

**Contact Centre:** The term contact centre is sometimes used in place of the term call centre. This reflects the fact that these centres often handle customer contacts from e-mail and the World Wide Web as well as phone calls.

**CRM (Customer Relationship Management):** The strategy of identifying customer needs, improving customer interactions, and customizing contacts, sales approaches, and automation to provide optimum service to each type of customer to maximize the bottom line benefits to the organization.

**CTI (Computer Telephony Integration):** This refers to systems that enable a computer to act as a call centre, accepting incoming calls, and routing them to the appropriate device or person. CTI systems have become quite sophisticated, handling all sorts of corporate communications, such as phone calls, faxes, and Internet messaging.

**Inbound:** Describes a call centre in which the agents wait for outside calls to come in to them rather than make calls out. Inbound call centres perform many varied tasks, such as sales, customer support, and help desk.

**Outbound:** Describes a call centre in which the agents make outgoing calls rather than wait for incoming calls. Outbound call centres perform many tasks, such as telesales, follow-up support, and opinion surveys, to name a few.

**Web Call Centre:** A call centre integrated to a Web site. It offers services on Internet.

# Citizen Consultations via Government Web Sites

C

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## INTRODUCTION

Cynicism toward government is largely a function of trust and social capital (Berman 1997; Putnam 2000). The relationship between government and its citizens has been strained. First, some citizens cynically feel as though government officials abuse their powers in the interest of self-aggrandizement; second, citizens often feel disconnected from government; third, government service delivery is frequently portrayed as inadequate. Administrative strategies to reverse these perceptions typically emphasize the benefits of government and improved service delivery. Some go further, offering individuals a means of influencing public policy and government decision-making, as opposed to traditional structures and cultures of policymaking that minimize citizen input. The Internet is a potentially powerful means for citizen consultation, and may help cultivate a governmental landscape in which information is more accessible, people feel more connected to government, and citizens are better able to participate in political and decision-making processes. This article examines the Internet as a consultative medium, whereby emphasis is placed on government efforts to use Web-based applications as a means of promoting meaningful citizen participation.

## DIGITAL DEMOCRACY: A THEORETICAL EXAMINATION

According to John Stuart Mill (1991), the ideal public sphere is one where debate and differences of opinion flourish. Integrating diverse groups into the public discourse helps to engender and sustain societal stability. Mill advocated tolerance for alternative views points, even those that are thought to be socially deviant, thus minimizing the likelihood of social tyranny and preserving individual autonomy. Mill envisioned a public sphere in which the masses assemble in civic spaces and engage in a pluralistic discourse, helping to prevent ignorance and prejudices from unduly influencing the policy-making process.

Public realm theorists such as Habermas (1989) emphasize the importance of social mechanisms that allow private individuals to pass judgment on public acts. Habermas provides a historical description of European social institutions throughout the 17th and 18th centuries, namely the English coffee houses, German literary societies and the salons of France. These institutions brought together generic intellectuals and created forums for debate regarding the state of society. According to Habermas (1984), the ideal public arena fosters inclusive and voluntary citizen participation within the context of influencing how government power is wielded. Today, the notion of digital democracy has been championed by some as a means of realizing Mill and Habermas' conceptions of the ideal pubic sphere. The notion of digital democracy encompasses the use of information and communications technologies (ICTs) in the practice of democracy.

In the context of a democratic system, citizens have a measure of influence over the policies impacting their lives. The relationship between government and citizens is foremost within a democratic system. In a digital democracy, emphasis is placed on the processes and structures that define the relationships between government and citizens, between elected officials and appointees, and between the legislative and the executive branches of government. According to Hacker and van Dijk (2000, p. 1), digital democracy refers to "a collection of attempts to practice democracy without the limits of time, space and other physical conditions, using ICTs or computer-mediated communication instead as an addition, not a replacement for, traditional 'analogue' political practices." Nugent (2001, p. 223) refers to digital democracy as "processes carried out online—communicating with fellow citizens and elected representatives about politics." Digital democracy may be defined as all practices to improve democratic values using ICTs.

Kakabadse, Kakabadse, and Kouzmin (2003) maintains that ICTs and digital applications may alter the

dynamic of representative democracy by affording citizens a direct means of influencing the public policymaking process. This may include virtual town hall meetings, online consultation portals, and other Internet-based applications where citizens can debate policy and convey their views. Given the rapid development of ICTs, citizens can participate more freely and consult on public policies (Holzer, Melitski, Rho, & Schwester, 2004).

O'Looney (2002) compares the interaction between citizens and government within the context of traditional and digital democracy. According to O'Looney, while communications are filtered through representatives and the media in a traditional democracy, direct communications among citizens, public managers, and technical staff are now possible in a digital democracy. Communications with citizens involve a one-message-fits-all approach in a traditional democracy. Within a digital democracy, official communications may be personalized based on an individual's interests and needs, and citizens can potentially track and influence decision-making at every step in the policy making process, ranging from agenda setting to a final vote. Further, government openness and transparency are central components to digital democracy. The integration of Internet-based applications that allow citizens to obtain information and consult on specific policies may prove ideal in terms of fostering an increased sense of public engagement. This, in turn, may help to reduce citizen cynicism and restore a healthier level of trust in government.

## INTERNET-BASED CONSULTATIONS: NOTEWORTHY EXAMPLES

Governments throughout the world are increasingly using the Internet as a means of engaging citizens (Holzer & Kim 2004). Internet applications have the potential to reconnect citizens and decision-makers, publicizing views presented by consultative parties, and providing greater opportunities for citizens to influence public policy. In the context of this discussion, Internet-based consultations are broadly defined as applications that allow individuals to convey their opinions regarding specific policy considerations. Internet-based consultative mediums need not be deliberative or dialogical in nature, even though this would be more ideal.

Jankowski and van Os (2002) examined Internet-based political discourse in the City of Hoogeveen (Netherlands). Established in 1996, *Hoogeveen Digital City* serves as the formal Web site for the municipality, and is considered one of the more advanced community networks in the context of engaging citizens in digital-based politically oriented discussions. Hoogeveen experimented with three specific Internet-based discussions: (1) the digital consultation hour, (2) digital debate, and (3) digital discussion platform. The digital consultation hour is a bimonthly discussion of community issues. It is a synchronous, real-time exchange between Hoogeveen elected officials and citizens, and it is facilitated through a question and answer format. The digital debate was a real-time event used during the 2002 municipal elections wherein citizens were able to deliberate policy issues and pose questions to candidates and party representatives. Finally, the digital discussion platform is an online public space that allows citizens registered within the network to discuss predetermined community issues.

The *Virginia Regulatory Town Hall* is a public space that affords citizens a means of becoming actively involved in the rulemaking process, as they are able to convey their opinions and concerns via an electronic comment form (which resembles a Microsoft word document). As of October 2004, forty proposed regulatory changes were open for comment. The Town Hall further provides citizens with information regarding proposed regulations and changes, agency background discussions, economic impact analyses of proposed regulations, and agency guidance documents, all of which are designed to help citizens interpret agency regulations, and better ensure knowledgeable citizen participation in the rulemaking process. The public may access regulations by subject, title, cabinet secretariat, agency, and board. Moreover, the Town Hall provides citizens with information on meetings and public hearings, which includes:

- Meeting title
- Host agency and its Web site
- Date and location of the meeting
- Purpose of the meeting
- Agenda and minutes
- Information on handicapped accessibility and deaf interpreters
- Meeting contact information, including name, address, phone number, and e-mail.

Information regarding regulatory actions and meetings is disseminated via email to those having registered with the Town Hall.

Similar to the Virginia Regulatory Town Hall, *Regulations.gov* allows citizens to submit electronic comments regarding proposed federal regulatory changes. Since its development, Regulations.gov has averaged approximately 6,000 hits daily (Miller, 2003) and has established itself as a key component of the digital rule-making initiative by improving quality and access to the government regulation writing process. According to Neil Eisner,

former assistant general counsel for the Department of Transportation, Regulations.gov will likely open the rulemaking process to individuals outside of the nation's capital and the special interest lobby, serving as an egalitarian means of influencing public policy (Skrzycki, 2003a).

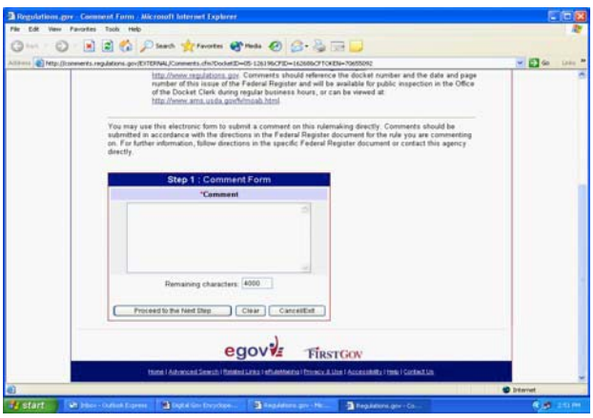
Regulations.gov is the first of a three-module e-rulemaking initiative. Module Two calls for the integration of an online federal docket management system, whereby individuals will be able to access all publicly available regulatory material, including federal register notices and rules, supporting analyses, and public comments regarding proposed regulatory changes. Module three is envisioned as a tool for regulation writers, including applications such as virtual meeting spaces for those writers and analyses of public comments (Morales, 2003).

Through Regulations.gov, citizens can identify regulations open for comment by topic, key word search, or Federal agency. For example, selecting "Internal Revenue Service" from the agency menu allows individuals to view proposed IRS regulatory changes (in either HTML or PDF format) that are open for public comment. Information appearing in the descriptions of a regulation open for comment include:

1. Title
2. Subject category
3. Text and PDF files linked to the description and full text of a regulation
4. **Proposed Rule or Rule:** Proposed rule indicates notices of proposed rulemaking, advance notices of proposed rulemaking, and extensions of comment periods. Rule indicates final rules with request for comment, interim final rules, direct final rules, and reconsiderations of final rules
5. **Docket ID:** Allows agencies to easily track regulatory actions open for public comment
6. **Code of Federal Regulations (CFR) citation:** Corresponds to the section of the CFR that an agency is amending or proposing to amend
7. **Published:** Refers to the date on which the rule or proposed rule was published in the federal register
8. **Comments Due:** Refers to the closing date of a consultation period
9. **How to Comment:** Guides citizens through the comment process

The *How to Comment* section guides citizens through the consultative process. Specifically, when an individual clicks on *How to Comment*, they are directed to a Web page through which they may submit an electronic comment (see Figure 1). According to Oscar Morales, director of the e-rulemaking initiative for the Environmental Protection Agency.

*Figure 1. Regulations.gov comment form*




The primary goal of this initiative (Regulations.gov) is that we are trying to make it more likely that the public will participate. Right now, if you are a small business owner out in the mid-west and you want to participate in the rule making process … that is to say you want to find out which agencies regulate you and/or which rules affect you right now … you could, with a little bit of effort, do that. You would have to know the agency, you would have to know whether they had an open rule, you would have to have a (personal computer), of course, and you could do it (through Regulations.gov). More than likely, however, (the small business owner) would have sent in their $15 to the public interest firm in Washington D.C. or their $50,000 to their law firms here on retainer and (they) would be the ones who would conduct their business by way of participation in the regulatory or rulemaking process, make the comments at the appropriate time, and they would be the one's who do it. What this initiative is trying to do to is enable those citizens, if they so choose, to participate (Morales, 2003).

Nevertheless, skeptics note that online applications such as Regulations.gov and the Virginia Regulatory Town Hall may emerge as another conduit for the political elite. For example, the National Association of Manufacturers has reportedly provided its membership with an electronic template for commenting on proposed federal regulations. Gary Bass, executive director of OMB Watch, (an advocacy group that promotes government accountability and citizen participation), believes that businesses and special interests are likely to benefit in the short-term because of their access to technology (Skrzycki, 2003b).

The United Kingdom recently revamped its Internet-based applications, having launched *Directgov*, a government portal site that provides access to 2,500 govern-

ment Web sites. According to Andrew Pinder, former e-envoy to the prime minister, Directgov simplifies contact between government and the citizenry. Directgov evolved from UK Online, which was a nationwide effort to connect all government departments to the Internet by 2005. Directgov has a citizen participation component in that it provides an external link to a "consultations index," which allows citizens to play a role in public policy consultations. Through the index, users are able to browse or search proposed government policies and register their opinions. As of October 2004, there were 223 policies open for public comment through the consultations index.

There is some criticism of Directgov, as it has yet to integrate electronic services provided by local governments, and about percent of citizen-government contact occurs at the local level. According to Nigel Hannam, head of e-services of Surrey county, "given the number of citizen transactions that are processed by local authorities compared with central government, it's crucial that local authority information is fully integrated (into Directgov)" (Olsen, 2004).

## FUTURE TRENDS

Ideally, Internet-based applications offer ignored groups a greater voice, thereby narrowing the participatory gap in public policymaking. Having been applied in a number of cities throughout the United States and Europe, Internet-based applications allow more citizens to participate in the policy discourse. They have the potential to reconnect citizens and decision-makers, providing greater opportunities for citizens to influence public policy (Malina 1999; Tsagarousianou, Tambini, & Bryan 1998). Moreover, Internet-based applications may overcome what Irvin and Stansbury (2004, p. 62) refer to as "non-ideal conditions for citizen participation," such as geographically dispersed populations that make face-to-face meetings inherently difficult.

The Internet as a consultative medium presents specific challenges, most notably the *digital divide*. This divide draws a distinction between those with Internet access and Internet-related skills and those without such capacities. It weakens the Internet as a mainstream and inclusive consultative medium to the extent that it disproportionately impacts lower socio-economic individuals who have historically played an insignificant role within the public policy process (Norris, 2001). A parallel criticism is that Internet-based applications are skewed towards technical experts fluent in the jargon of public policy, which will alienate average citizens. While experts largely influence public policy dialogues, this may be more pronounced through digital and Internet-based conduits. In addition, the Internet as a communications medium favors individuals with strong writing skills, and these individuals tend to have greater access to financial resources and education.

Another issue to be considered is whether policymakers should give Internet consultations the same consideration they give other policy feedback mechanisms, such as traditional town hall meetings or pubic hearings. Furthermore, public policy makers need to consider if Internet consultations should serve as alternatives to traditional mechanisms for engaging citizens in the pubic policy process, or if they should replace traditional methods. In other words, should the Internet supplement, complement, or be essentially the same as off-line public hearings? Oscar Morales, director of the e-rulemaking initiative for the Environmental Protection Agency, envisions online consultations as supplementary to existing mediums. Morales believes that "most of the rulemaking process is paper-to-paper deliberations. You'll probably always have some face-to-face interactions" (Morales, 2003).

The future development of Internet-based consultations should encompass the integration of more dynamic applications. Regulations.gov, the Virginia Regulatory Town Hall and Directgov's consultations index are static applications. That is, such mediums do not facilitate a real-time, synchronous exchange between citizens and government representatives. More dynamic consultative mediums, similar to *Hoogeveen Digital City*, would help to further bridge the gap among citizens, policymakers, and elected officials. However, unless carefully moderated, real-time synchronous consultations could become chaotic. Unmediated consultations may even become abusive and unfocused (i.e. Internet flaming), and therefore elected officials and other decision-makers with whom citizens wish to interact may be reluctant to participate.

## CONCLUSION

The notion of digital consultation is a reality, as governments are using the Internet to facilitate open dialogue between citizens and government. By and large, Web-based applications show great potential for democratic renewal, especially with regard to reconnecting citizens to government, which may help to overcome participatory apathy and cynicism toward government. The process reduces travel costs for participants in the public policy process, as they need not travel to one location to participate in traditional public meetings. Cases at the national level and the international level demonstrate that, when given the opportunity, citizens will use the Internet to share their ideas and suggest comments or recommenda-

tions on public policy in a virtual, as opposed to a physical, space.

Government should work to identify, study, and implement mechanisms that allow citizens to participate in the public policy process. Regulations.gov and the Virginia Regulatory Town Hall have both provided citizens with opportunities to engage meaningfully in the rule-making process. Portal sites for citizen consultation have opened virtual public spaces for citizens and/or interest groups to deliberate specific rules. By following these model, governments at state and local levels can generate multiple interactions between citizens and governments for deliberation across a range of social issues. More often than not, however, the public sector fails to aggressively market new services and innovations. Marketing Internet-based consultations is a prerequisite for success. Marketing strategies should include the dissemination of materials underscoring not only the availability of Internet consultations, but also the potential benefits of citizen participation. The cases presented in this article demonstrate that government can engage citizens through technology. Internet-based applications are viable and complementary means of participating in the policymaking process. In spite of the public sector's progress, a slow response by citizens could weaken the viability of Internet consultations as a necessary adjunct to existing participatory mechanisms.

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## KEY TERMS

**Digital Democracy:** Encompasses the use of ICTs in the practice of democracy, whereby emphasis is placed on the processes and structures that define the relationships between government and citizens, between elected officials and appointed civil servants, and between the legislative and the executive branches of government.

**Digital Divide:** Refers to segments of the population lacking Internet access or Internet-related skills.

**Digital Voting:** The use of the Internet or computer-based systems in the process of voting. Internet voting is simply a type of digital voting whereby an electronic ballot is transmitted to election administrators via the Internet.

**E-Rulemaking:** The integration of Internet-based applications and other ICTs as part of the formal regulations writing and comment process. *Regulations.gov* and The *Virginia Regulatory Town Hall* are examples of e-rulemaking applications.

**ICTs:** Information and communications technologies that facilitate citizen participation in government. ICTs may include networked computer systems and Internet-based applications, such as policy or consultation forums, bulletin boards, etc.

**Internet-Based Consultations:** Internet applications that afford citizens a means of providing input regarding specific government polices.

**Portal Site:** A Web site serving as gateway to other related Web sites. The United Kingdom's *Directgov* is an example of portal site, as it provides access to government information, services, and citizen consultations.

# Citizen Participation and Digital Town Hall Meeting

C

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## INTRODUCTION: THE PROMISE OF PARTICIPATION

If part of the promise of digital government is to enable citizens and businesses to enjoy greater convenience in their interaction with government, another goal is to revitalize democracy itself. A decline in civic engagement between citizens has been noted in society (Putnam, 1993) while citizen distrust of political institutions is on the rise (King & Stivers, 1998). Both trends do not augur well for democracy. Democratic theorists and public administration scholars have argued that one way to reverse these trends is to foster greater citizen participation in public decisions.

Why is participation so important that B. Guy Peters (1996) points to it as one of the four main alternatives for the future of governance? Participation is justified as a normative right, a contributor to better public decisions, and an enabler of higher social capital. One broad rationale underlying greater participation the rise of postmodern values among citizens, characterized by both a distrust of formal institutions such as government and political parties, and a desire for more participatory democracies (Inglehart, 1997). Societal changes, particularly increased education, lead to a greater demand for involvement and access to information (Thomas, 1995). Access to information is facilitated by new technologies. Citizens therefore enjoy both the will and the means to break the monopoly and centralized control on public information enjoyed by the government (Cleveland, 1985).

Participation is also justified in terms of benefits to individual citizens and society more broadly. Any form of citizenship beyond simple legal status requires active citizen involvement in public matters and the community (Cooper, 1984). Participation serves to establish the worth of individual citizens, allowing them to feel a sense of ownership and take an active part in controlling their surroundings and developing their capacity to act as citizens. The process of public deliberation also benefits society by creating democratic legitimacy and a deliberative political culture (Habermas, 1996).

One basic barrier to enhanced citizen participation is the nature of bureaucracy itself. Barber (1986) has argued that government has become a form of "representative bureaucracy" that undermines individual responsibility for beliefs, values, and actions, and is incompatible with freedom since it delegates and alienates political will. The values of bureaucracy are based on expertise and qualifications, conflicting with democratic values that underpin the idea of participation. Citizens are defined as non-expert outsiders who may have to be listened to, but are likely to have little actual impact on decisions. This is reflected in the failings of traditional modes of citizen participation.

Subject to particular ire is the town hall meeting/public hearing mode of participation. King, Fetley, and Susel (1998, p. 323) say: "The most ineffective technique is the public hearing. Public hearings do not work." Such meetings can be poorly attended and dominated by elite, non-representative groups (Fox & Miller, 1996). Hearings are often timed late in the decision process, used to convince citizens of pre-made decisions rather than gain their input, and provide no opportunity for an iterative dialogue. They have also been critiqued for fostering self-interested claims rather than concern with the general welfare of the citizenry and deemed unsuitable to foster choices between policy tradeoffs. Citizens attending public hearings tend to have little background information on issues, often leading to poorly informed opinions about policy and the working of government (Ebdon, 2002).

Can the problems of the traditional town hall meeting be solved through a more digital approach? Yes and no. As this article will show, digital town hall meetings, if well organized, can enable a large and diverse group of citizens to engage in an intelligent iterative dialogue with each other and with elected officials. However, whether this input ends up shaping governmental decisions still rests largely in the hands of public officials.

## BACKGROUND: THE DIGITAL TOWN HALL MEETING IN PRACTICE

Efforts have been made to reinvent the town hall meeting using technology since the 1970s. In 1976, public officials in Reading, Pennsylvania began to televise public forums

and invited members of the public to offer comment or question via telephone (Becker, 1993). This approach can now be extended to allow public responses via the internet. One drawback of this model is that citizens are not physically present at such meetings.

The non-profit organization AmericaSpeaks is a strong proponent of the possibilities of digital town hall meetings that allow a high number of citizens to meet in the same physical space and engage in meaningful discourse. A digital town hall meeting uses technology to foster more meaningful interaction between citizens and public officials. During 1998-1999, AmericaSpeaks engaged thousands of Americans on the future of Social Security through a variety of interactive mechanisms, including five town meetings. It helped Hamilton County, Ohio to develop a comprehensive master plan based on town hall meeting with 1,300 citizens. In this article, I focus on two high-profile uses of digital town hall meetings, one of which is tied to the budget process in Washington D.C., while the other deals with highly symbolic city planning effort in New York City. By focusing on these two cases I develop an in-depth narrative that explains how the process worked and the relative the influence of technology-driven participation in each case. Readers wishing to learn more about AmericaSpeaks can visit: http://www.americaspeaks.org/.

In 1999, the mayor of Washington D.C., Anthony Williams, established a series of "citizen summits" to incorporate citizen involvement in the city government's strategic planning and budget process (Moynihan, 2002). The Office of Neighborhood Action was created to organize citizen participation that would link to district strategic planning. The Office initiated the goal-setting process prior to the citizen summit, facilitating two cabinet retreats that generated broad goals. Following the retreats, cross-agency task forces led by the Mayor's Office developed more detailed strategic plans around these broad goals. The Office of Neighborhood Action summarized the draft strategic plan into a four-page tabloid version to present to citizens both before and at the citizen summit. This was intended to inform the citizens to the basic issues in order to improve the nature of the dialogue that occurred.

The summit itself lasted over seven hours and included the development of district and neighborhood vision statements, discussion of citywide priorities and the draft strategic plan, and identification of action items to be carried out in each neighborhood. Efforts were made to ensure that all elements of D.C.'s diverse citizenry were reached—the summit was open to all comers, and summit literature and translations of the proceedings were available in Spanish, Vietnamese, Korean, and Chinese. Demographic surveys of the summit found it to be racially representative of the district's population.

The 3,000 people who attended the summit were divided into tables of 10; trained facilitators sat with each group to promote meaningful dialogue. The digital aspect of the meeting was reflected in two different kinds of technologies: networked laptop computers and wireless polling keypads. The computers recorded the messages developed at each table. As respondents sought to develop a consensus in addressing the issues raised and decide what messages would be entered into the computer, each group engaged in a discussion. The computers allowed the mayor to receive and respond to the messages during the forum. The polling keypads also allowed the mayor to ask citizens to vote on any question during any point of the summit, providing instantaneous results on large screens at the front of the room. Citizens prioritized citywide goals, which were ranked according to level of support. The data collected through the keypads was cross-referenced with demographic data based on a participant survey.

The input from the meeting served to shape the format and allocation of resources in the district's budget. The next budget request to the City Council saw each department identify strategic issues which were raised at the summit and codified in the strategic plan, subsequently requesting resources to pursue these goals. The meeting also pushed for suggestions of how to solve problems at the more local level, encouraging residents from different wards to register their opinion on neighborhood issues. The summit became the first step for more localized district/citizen planning efforts through a series of Strategic Neighborhood Action Plans. In addition, the head of each department had a performance contract and a public performance scorecard—a single-page list of the key performance targets and measurement of success or failure in achieving those targets–that incorporated goals raised at the summit of relevance to the department.

Following the summit, the revised strategic plan was presented to citizens at a similar forum on January 29, 2000, where 1,500 citizens (60% of whom had participated in the first summit) had the opportunity to hold the mayor accountable for the revisions made and offer final messages before the plan was completed. The final version of the strategic plan bore the clear imprint of the meetings. The front section of each issue-driven chapter identified specific priorities raised at the citizen summit and related strategic goals, action items, and performance targets.

Another digital town hall meeting occurred in New York City in the aftermath of 9/11 (Moynihan, 2004). Authorities sought a way to incorporate public input into the planning process for rebuilding the site of the World Trade Center. AmericaSpeaks was hired to run two meetings—one for the Civic Alliance, a nonprofit coalition of civic, labor, business and environmental groups, and

*Table 1. Reinvigorating the town hall meeting*

| *Critiques of traditional town hall meeting* | *Lessons of digital town hall meeting* |
|---|---|
| Slow, expensive and time-consuming to listen to large numbers of citizens | Digital meetings require careful organization and resources, but can facilitate input of thousands in a single meeting |
| Not representative of citizenry; dominated by middle and upper class | Undertake extensive outreach; track aspects of representativeness through poll of participants |
| Participants driven by self-interest rather than community problems; unable to make tradeoffs; provide mixed messages to government | Structure presentation of questions to force consideration of wider issues and tradeoffs between different policies; generate discussion and seek clarity through polling of ordered preferences |
| Dialogue is not iterative; citizens voice grievances in disconnected way | Can create iterative dialogue through facilitation of small-group discussion, ordering of questions and responses to follow-up questions on polling keypads |
| Participation primarily symbolic to provide sense of legitimacy to decision process | Level of influence depends on willingness of public officials to listen; however, direct involvement of officials, media coverage of events and clarity of citizen preferences can put pressure on government |

academic institutions, and the other for the Lower Manhattan Development Corporation, a specially created public body charged with planning the redevelopment of lower Manhattan. The events became know as Listening to the City. The first meeting in February 2002 featured over 500 citizens, while the second, in July featured over 5,000.

The impact of the second meeting was striking. The audience was presented with six designs for replacing the World Trade Center. All were criticized as being mediocre efforts, resulting in a dense and uninspiring thicket of buildings that added little to the city skyline. Cheers went up as low polling results for each design were projected on large screens at the meeting. There was consensus between participants that a spectacular and symbolic design was required to reinvigorate the New York skyline. While disagreement may have existed on what this design might look like, participants made it clear that it was not contained in the six designs presented. They made it so clear, in fact, that at the end of the meeting representatives of the Lower Manhattan Development Corporation, and the World Trade Center owner, the Port Authority, promised to offer new designs based on an international worldwide competition. The meeting was covered by local, national, and even international media. A New York Times editorial page (2002) concluded that "public opposition saved the city from the ordinary."

While in some respects Listening to the City was a success, participants did not have the degree of influence on the final design that they wanted. After the next rounds of designs were invited, the finalists were publicly displayed, and the public was invited to offer comment, but another high-profile digital town hall meeting was not organized. Public officials and especially Governor George Pataki felt pressure to choose a design quickly. Even after a specially-created committee selected the Studio Daniel Libeskind design, this too was subject to a redesign by David Childs, the architect of leaseholder Larry Silverstein. A key change demanded by Silverstein was more commercial space, which was one of the problems that the participants of Listening to the City had identified with original designs. The resulting design, which became known as the Freedom Tower, incorporated portions of the Liebeskind design, including a towering spire, but in most other respects reflected the preferences of Childs. In July of 2005, the Freedom Tower was redesigned once more. The New York Police Department had argued that the base of the building needed to be further from the street and feature stronger fortification due to concerns about possible truck bombs. The resulting design by Childs essentially abandoned the key motifs of the Libeskind design, with the exception of the symbolic 1,776 foot height.

Listening to the City represented the maximum moment of public influence in the process, rejecting a constrained choice of mediocre designs. But in terms of selecting the final design, the public was excluded. Even if we accept Libeskind's claim that his original design had the imprimatur of public approval by virtue of emerging from a new selection process necessitated by the Listening to the City meeting, this design was increasingly relegated to the preferences of Silverstein and Childs. The two rounds of redesigning the Freedom Tower occurred behind closed doors and were presented to the public as a fait accompli.

## FUTURE TRENDS

What lessons do the cases offer about the future of digital town hall meetings? Perhaps the best way to consider these lessons is to reexamine the criticisms of the traditional town hall meeting and see how the digital town hall approach served to overcome these problems. Table 1 presents this comparison, and while it is clear that the digital town hall meeting does not ensure perfect participation, it does offer an improved option for governments intent on taking citizen input seriously.

Perhaps the most obvious lesson is that technology can reinvigorate the traditional town hall meeting. The experience of the citizen summits in Washington D.C., and to a lesser extent Listening to the City, suggest it is possible to bring together a representative group of thousands and use technology to allow them to have an interactive dialogue with public officials. Trained facilitators played a key role, encouraging members of the small groups to contribute during the day-long experience. The use of specific topics, computer feedback, and polling summarized the results of these conversations into concise points.

In both cases, the need for the legitimacy offered by visible and meaningful public participation made public officials willing to try the digital town hall. Mayor Anthony Williams was seeking to change Washington D.C.'s image of corruption and incompetence. In New York, public officials faced an unsolicited outpouring of public opinion and design suggestions that reflected the citizens' sense of loss and emotional connection to this decision. To have ignored the public completely was unthinkable.

There are differences between the cases also. The citizen summits were more representative of different demographic groups than the Listening to the City meetings, especially in terms of race and income. Habermas (1989) has argued for the importance of including all affected by a decision and disregarding social status of the participants when organizing citizen feedback. This suggests the importance of active and targeted outreach in ensuring a representative sample of the citizenry. More broadly, the cases point to the need for careful organization to facilitate citizen input with digital town hall meetings.

More importantly, the citizen summits had greater influence on decisions than Listening to the City. In Washington D.C., the mayor used the digital town hall meetings multiple times, first to craft a strategic plan, and then to seek public approval of this plan. In the case of the Listening to the City, public involvement was limited to early stages of the decision process, due to perceived time pressures and worries of another rejected design. Perhaps the differences are also explained somewhat by the nature of the decision at hand in both cases. Strategic plans are essentially statements of broad policy goals, something that the citizenry is fundamentally qualified to comment on (Hellström, 1997). Officials may have been less willing to trust qualifications of the public with architectural choices of design. In addition, the role of Silverstein meant that private actors had a much greater degree of control over the decision outcome in New York.

This difference between the cases reflects that despite the benefits of the digital town hall there is no guarantee that the input of these meetings will have a direct influence on decision outcomes. A key criteria for assessing participation is whether it has any meaningful impact on decisions. As with any type of citizen input, the influence of digital town halls depends on the willingness of public officials to take this information into account (Moynihan, 2002).

## CONCLUSION

What can we conclude about digital town hall meetings? An optimistic perspective assumes that as the concept becomes better known, as technology declines in cost, we can expect to see this form of participation increase. The digital town hall meeting requires greater resources and effort on the part of government than alternative technological routes to participation (e.g., online discussion groups or polling). But it also has the virtues of the traditional town hall model—citizens coming together to share their views in person, voicing their concerns, and interacting with each other and the officials that represent them. In this respect, it is an innovation that seeks to use technology not to replace a traditional practice of democracy, but to make it more effective.

A more pessimistic perspective regards the technological sophistication of the meetings as irrelevant, offering symbolic value but little else. From this perspective, public officials will schedule and listen to such feedback when it suits them. The pessimistic view understates the real value that technology can bring to managing the logistics of town hall meetings, but it does point to a critical issue. Ultimately, the success of these meetings depends on governmental willingness to use and listen to the results of digital town hall meetings.

For researchers, three obvious questions emerge: what explains the adoption of these innovations? If they become common and move beyond the novelty stage, will they still manage to incorporate enthusiastic citizen involvement? Finally, how do the results of these forums ultimately shape public decisions, if at all?

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## KEY TERMS

**Digital Town Hall Meeting:** A town hall meeting that uses digital technology to foster more meaningful interaction between citizens and public officials.

**Facilitators:** In digital town hall meetings, trained facilitators help citizens create meaningful and coherent feedback.

**Participation:** Ways in which citizens can provide direct feedback to government. Participation advocates argue for such involvement beyond the simple act of voting, and suggest that technology can facilitate participation.

**Performance Scorecard:** A performance scorecard is a short summary of key performance targets and measurement of success or failure in achieving those targets. Scorecards can be created by governments or third parties to track whether citizen goals are being met.

**Polling Keypads:** In digital town hall meetings, wireless polling keypads can be used to facilitate rapid, large-scale and iterative interaction between citizens and public officials. Individuals respond to questions by selecting from a range of alternatives using the keypads.

**Strategic Plans:** Strategic plans identify the mission, values and goals of a government, agency or program. Because they involve statements of values rather than matters of technical expertise, they are an appropriate venue for participation.

**Traditional Town Hall Meeting:** A public hearing where citizens present their views to public officials. Criticized as being non-representative and failing to produce meaningful dialogue.

# Citizen Relationship Management

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## INTRODUCTION

Citizen relationship management (CiRM) refers to a cluster of management practices, channel, and IT solutions that seek to use private sector customer relationship management (CRM) in the public sector. Goals can be improving citizen orientation, better accountability, and changing the citizen government relationship. I begin with an overview of citizen orientation in government and the emergence of CiRM. The following section starts with a look at the underlying principles, goals, and components of customer relationship management. Accordingly, there is an in depth discussion and definition of citizen relationship management. Aspects such as the citizen government relationship, technology, public participation, and organizational changes are addressed. Finally, future trends and conclusions are drawn.

## BACKGROUND

It is one of the central interests of government to improve the relationship with its constituents. Public administration (PA) is often ignored in the discussion of the citizen government relationship although it plays a vital role in how the government exerts its role within society. Administrative practices and capabilities are often subsumed within the general discussions of government and governmental obligations to citizens. In fact, with a few exceptions, philosophical foundations of the administrative component of government are seldom discussed at all (Rohr, 1986; Waldo, 1984). On average, citizens have more contacts with public servants than their elected representatives throughout their life. They experience policies and the structure of the state through their interactions with the public administration, the latter being for instance law enforcement or public service agencies. Local public administrations are a strong factor for trust building in the discussed relationship.

The intense competition in the private sector and parallel service sector growth has fostered research and focus on customer management related topics (Bretthauer, 2004; Laing, 2003). Furthermore, private sector customer service orientation had an influence on expectations towards public sector services.

Improving public services can be tracked back to the beginning of the 20th century. Throughout the late 1970s and since the emergence of neo-economic new public management (NPM) and its components like total quality management (TQM) (Berman & West, 1995), a customer-driven government has been on the agenda for public servants and researchers (OECD, 2003; Osborne & Gaebler, 1992). This is due to the fact that customer demands are perceived as an agent for organizational change (Lowenthal, 1994). Today, NPM has become a normative model, especially how we think about the role of public administrators, public services, and their goals (Denhart & Denhart, 2003). In fact, as shown by Schedler (2003) or Hood and Peters (2004), there is no common way or understanding of NPM. Despite components like TQM, which is a set of management and control activities based on statistics, leadership of top management and involvement of all departments and levels of employees aimed at quality assurance and citizen orientation, NPM tended to have a one-sided, internal focus on issues such as economic controlling (Traunmüller & Lenk, 2002). This might also relate to NPM's missing theoretical foundation (Frederickson & Smith, 2003; Lynn, 1998).

Customer approaches to government service increased in the 1990s (Albrecht, 1993; Gore, 1993; Kißler, Bogumil, Greifenstein, & Wiechmann, 1997; Swiss, 1992. Especially true with the managerial/consumerist notion of deconstructing citizens as a consumers raised concerns among researchers (Barnes & Prior, 1995; Hood, 1995). A major objection is that the citizen government relationship is redefined as a passive commercial transaction, rather than an interactive political engagement. It strengthens the idea of elitist politics and reduces a complex relationship to a simplistic voluntary one (Box, 1999). Furthermore, it supports short term politics undermining long term political goals (Swiss, 1992).

The emergence of electronic government (e-government) in the late 1990s added new momentum to the NPM oriented reforms and research on public services improve-

ment through online applications (Abramson & Morin, 2003; Ashford, Rowley, & Slack, 2002; Caldow, 1999; Cook, 2000; Fountain, 2001a; Gisler & Spahni, 2001). I define e-government as the use of information technology to support government operations, engage citizens, and provide government services (Dawes, 2002). ICT neutralises time, spatial, and hierarchical limits of the public administration and public services.

Concurrent with these developments, first publications on public sector customer relationship management appeared (Accenture, 2003; Bleyer & Saliterer, 2004; Hewson Group, 2002; Freeland, 2002; Janssen & Wagenaar, 2002; Kavanagh, 2001; Richter, Cornford, & McLoughlin, 2005; Sharpe, 2000; Souder, 2001; Trostmann, 2002). At this point, it is neither possible to identify a clear research stream on CRM in the public sector, an adapted model or theoretical framework nor to identify the broad existence of public managers responsible for CRM. Other terms used are constituent relationship management or citizen relationship management. This article employs the term citizen relationship management.

## CUSTOMER RELATIONSHIP MANAGEMENT

Customer relationship management can be defined as a holistic management approach, enabled by technology with a broad customer focus, to start, maintain and optimize relationships and to make customers more loyal/ profitable. CRM requires a customer centric business philosophy and culture to support effective marketing, sales and service processes. This is an aggregation of existing perspectives on CRM (Payne & Frow, 2004). For a detailed overview of definitions and research streams see: (Zablah, Bellenger, & Johnston, 2004). Some authors emphasize a single technology solution, others a series of customer-oriented technology solutions and the final group stresses the holistic approach.

CRM's main goal is to optimize the customer lifetime value (CLV) within the customer lifecycle (Homburg & Bruhn, 2005). Customers are long term assets and thus major factors for competitive advantage (Peppers & Rogers, 2004). Further advantages are supposed to be a reduction of marketing costs, strengthening customer loyalty and satisfaction, reduced price sensitivity, new opportunities for up- and cross-selling and erect exit barriers (Janssen & Wagenaar, 2002).

CRM builds on principles of relationship marketing (Berry, 1983). Unlike transaction marketing which focused on a one time transaction (selling process), relationship marketing is about attracting, maintaining and enhancing customer relationships. Other influences come from TQM, business process reengineering (BPR) (McAdam & Donaghy, 1999), and knowledge management (KM) (Alavi & Leidner, 2001; Grover & Davenport, 2001; Nonaka, 1994. Note that TQM and BPR are already included in NPM. Several trends like ICT developments, rigid global competition, and growing knowledge in marketing research (i.e., one-to-one marketing (Peppers & Rogers, 1993), permission marketing (Godin, 1999)) had an impact on the evolution of CRM.

Besides its strategic/organisational component, customer relationship management can be divided into three parts: collaborative CRM, operative CRM, and analytical CRM. Collaborative CRM is focused on channel management. Channel options are:

- Shop/outlets/counter
- Internet
- Telephony (call center)
- Mobile
- Sales force

Collaborative CRM involves decisions about appropriate/ economic channel combinations, keeping single customer view and offering a consistent customer experience across channels. Particularly, electronic channels are very attractive as their self-service potential offers the chance to reduce costs (Kracklauer, 2003).

Processes in the back and front offices are integrated through operational CRM. Software applications can be enterprise resource planning (ERP), sales automation (SA), computer-aided selling (CAS) or knowledge management systems.

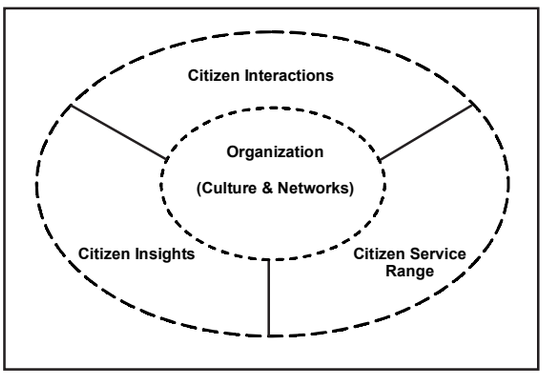
Organization and interpretation of customer data through data mining or OLAP and creation of a 360 degree view on customers are within the area of analytical CRM. Data warehousing, database management and data mining systems are an important part of the technological component of CRM.

Basic principles of CRM are personalization (products, information, services), integration (planning processes, business process reengineering, product development, collaboration), interaction (channels, long-term communication, surveys), and selection/ segmentation (identify the top 20% of customers who make 80% of the profit (pareto rule), termination of unprofitable customers). Moreover, quality/performance measurements, change management, and a strategy/measures promoting customer oriented culture are vital to any CRM concept or project.

Figure 1 summarizes these principles and visualizes the importance of the holistic approach of a CRM/CiRM. Thus, CiRM is about:

- Organization (change)
  - Culture

*Figure 1. The CiRM framework*




- Processes
- Structure
- Responsibilities
- Networked governance
- Cross-boundary collaboration

- Interactions
  - Channels
  - Participation
- Service range
  - Offering
- Insights
  - Analysis
  - Segmentation
  - Personalization
  - Performance measurement

## CITIZEN RELATIONSHIP MANAGEMENT (CIRM)

While identifying and retaining the most profitable or most costly citizens in a commercial sense would contravene against basic principles of social justice, delivering high quality citizen oriented public services is a government policy.

Citizen relationship management (CiRM) can be defined as a strategy enabled by technology with a broad citizen focus, to maintain and optimize relationships and encourage participation. This represents a working definition because CiRM is an emerging research area. CiRM is not a theory but rather a management concept. However, it is possible to build a theory on its impact which has yet to be done.

The main goal of CiRM is to create and optimize the relationship with citizens by embedding their opinions throughout public administration instead within a certain processes/ agency, certain hierarchy level or elected officials. Citizens are a valuable asset in service planning and provision (i.e., cost reductions). A responsive, accessible and citizen focused public administration that creates opportunities for participation can build a close citizen relationship strengthening democracy and legitimating its role.

Though, understanding and application of CiRM by PA practitioners is currently different than the academic discussion or business claims. Reviewing projects in the U.S. and UK, CiRM is mostly applied in conjunction with call centers (311) or citizen service centers (citizen interactions, citizen service range) with a focus on it's technological component at the local level. Technological collaboration across agencies and jurisdictional boundaries occurs, however change and collaboration on the organizational level or other aspects of CiRM is in its early stages.

Miami/Dade County is one of the first cases of a multi-jurisdictional collaboration and a multi-channel, closed loop environment with access to information and services of over 30 municipalities and their agencies in its final level of development. To achieve this, the county takes a gradual approach by bringing in new partners one at a time to cope with any inherent challenges and risks.

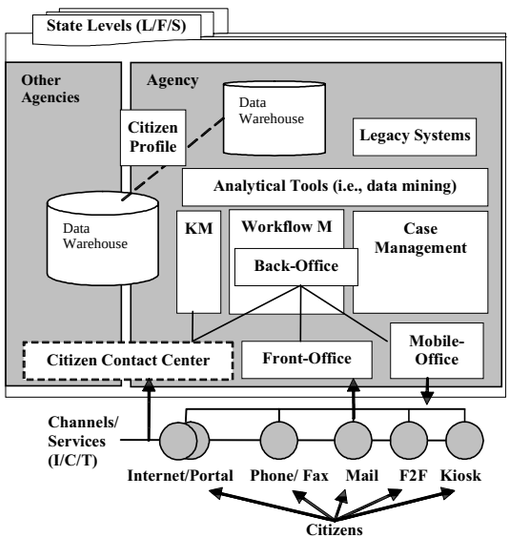
## Citizen Government Relationship

Before addressing CRM a deeper understanding of the citizen government relationship is needed. It can be reached through an analysis of the reciprocal factors and circumstances of both actors. In fact, psychology of the citizen as a customer/consumer of public services (demand side) as well as public service operations from citizen perspective is not very well researched (Reddick, 2005). To learn more about citizens, public administrations use surveys, focus groups and to a lesser extent citizen counsels. Unfortunately, most of (80%) of this kind of market research serves mainly to reinforce existing conclusions which is also the case for private businesses (Deshpande, 2001).

A major difference exists between customer business and citizen government relationships that offer interesting CiRM scenarios. Citizens in most countries are loyal to their government and public administration (Fountain, 2001b), something that would be a dream for any business. Citizens consider obligations to other, present and even future citizens. They have the moral and legal right (and obligation) to build or to participate in the institutions that provide public services. This is not the case for consumers.

Finally, some questions remain unanswered. Could CiRM help improving public participation? What do citizens think about their roles and segmentation? Are satisfied citizens more active or passive participants?

*Figure 2. CiRM technology framework*




## Contributions of a CiRM Technology Framework

A CiRM technology framework (Figure 2) enables public managers to respond in an accurate and appropriate manner to citizens' inquiries. Public servants have access to citizen profiles and knowledge base while they are in contact with constituents regardless of the channel or state level (local, county, federal state, federal). Currently most relevant channels for information (I), communication (C), and transaction (T) type services are counter/ one-stop service centers, inbound telephone, Web self-service, automated email response and kiosks.

Administrators can build new and real-time databases for future orientation. By cross-referencing citizen surveys with service usage and other related data from multiple organizations they can offer more personalized information, services and identify emerging problems (O'Looney, 2002), process or policy improvements. Since this would be an iterative process it fosters innovation.

## Citizen Data

According to a study by Accenture, a consulting company, two thirds of government agencies are not using citizen data they are collecting (Accenture, 2001). Citizen data can be grouped into profile data (i.e., name, address, age, or education), service data (i.e., complaints, suggestions, or questions), contact data (i.e., contact person at agency, date of contact) and service data (i.e., type of service, usage time, costs). Research by Schellong and Mans (2004) revealed that citizens would even allow a personal profile to be saved and shared across public authorities. Those are: name, address, date of birth, education, and the current employment status. Personal history of utilized public services (25%) and personal income (12%) are barely accepted for citizen data profiles. Nevertheless, citizens have more trust in government than in private sector internet services. Information sharing is absolutely necessary to realize the desired benefits of such systems. However, local authority data silos, laws, regulations and culture pose difficult obstacles to overcome (Bannister, 2001).

## Citizen Participation

CiRM attempts to integrate citizens into PA. Citizen participation is two-fold. First, it means self-service/ co-production. The more automated and standardized (by heavy use of ICT), services can be organized, the more money can be saved by PA and the more work is done by citizens. Organized well, it can raise satisfaction levels as experience from other sectors (i.e., banking) shows. However, design flaws will generate dissatisfied customers using other channels. Efficiency gains can be neutralized if the streamlining potential of ICT in conjunction with self-services is mainly used to reduce the work force in the PA. A case manager that has to work on comparative more cases can be equal or less citizen oriented (in terms of response time, case handling) than before.

The second form of participation is citizen feedback/ complaints on service provision (main focus), policies and any form of political issue (sub focus). Citizens reactions are good indicators of policy outcomes (Vigoda, 2002). Analytical CiRM might be able to provide the technical tools to analyze them. Unfortunately, research on citizen participation draws pessimistic conclusions on the willingness of citizens for continuous engagement (Roberts, 2004; Vries, 2000. In addition, many public administrators believe that greater citizen participation increases inefficiency, delays, and red tape (King, Feltey, & Susel, 1998).

## Organizational Changes

Beyond a change of the external relationships the internal relationships change. Agencies, departments, and public managers have to collaborate closely. Consolidations and changes of processes can be necessary measures. Individuals and organizational units need to treat each other like customers to be consistent with the intended cultural change of CRM and seamless service environment. Additionally, CiRM systems can give clerks low in

the hierarchy more accountability as the rules they are to follow can be embedded within the software and not the decision maker (Fountain, 2001a). As claimed by Janowitz and Delany (1957) CiRM systems in combination with other applications might finally connect the substantive knowledge (i.e., clients, face-to-face contacts) of lower level employees with the functional knowledge (i.e., strategy, communication, management) of upper-level administrators or policy makers and avoid their isolation and at the same time give them clear information.

However, a knowledge-centric system and organization requires a front-line worker who has a broad understanding of goals, strategies, stakeholders, and how their work fits in this context. A term being used is system-level bureaucrat (Reddick, 2005). How these people capable of executing such a new role can be attracted to public administration and how upper-level administrator will react to sharing the power of "knowing" has yet to be determined. Furthermore, transparencies through reorganization and ICT will cause political battles over such issues like ownership of data (Fountain, 2001a).

## Private sector CRM lessons

Technology facilitates improving citizen orientation or satisfaction, yet it is not required. The same conclusion is true for the private sector CRM (Rigby, Reichheld, & Schefter, 2002). Improving office hours, accelerating service processes through redesign, training employee friendliness are just some "offline" examples that have and had a positive impact on citizen satisfaction/citizen orientation (Bogumil, 1997). CRM does not mean that the PA starts offering new services demanded by the citizens and identified through data base analysis or market research. In the medium term, it rather supports tailoring existing services to citizens needs.

Recent empirical studies suggest that CRM technology only has a moderate to weak impact on overall success of companies' relationship building efforts (Reinartz, Krafft, & Hoyer, 2003). Reported failure rates of private sector CRM solutions can be up to 70% (Verhoef & Langerak, 2003). Interestingly similar success rates (20-30%) are reported from public sector TQM projects (Bennington & Cummane, 1997; Kelemen, 2000).

The organizational challenges inherent in any CRM initiative and the diversity of people involved pose another threat (Agarwal, Harding, & Schumacher, 2004). A large number of internal and external stakeholders creates accountability problems and makes behavioural/organizational change difficult. Many projects fail because of the lack of coordination between strategy and processes. Not establishing clear business goals before launching a CRM effort is one of the most common and important source of these problems (Ebner, Hu, Levitt, & McCrory, 2002). Public Administrations need a broad understanding of all processes and the demand side (here citizens). Continuous Leadership and communication by elected officials and executive administrators is a key to success even when there is strong opposition caused by the inherent changes over a longer period of time.

The 311/CiRM initiative in New York City is such a case. The 22 Mio USD project was planned and implemented during a budget crisis, fire stations were closed down and more than 20 administrative call centres were consolidated, but the success, especially from the citizen side, was so overwhelming that neither the media nor other political actors opposed.

Costs are as critical to companies as they are to cities, counties or federal states with tight budgets. It takes up to 36 months until a CRM strategy/system is implemented—a rather long time lag in the political sphere. Costs in the private sector usually run from 60 to 130 Mio. USD (Rigby, Reichheld, & Schefter, 2002), (Ebner, Hu, Levitt, & McCrory, 2002). Costs for a public 311 call-centres for cities like Miami, New York City or Chicago are around 15-25 Mio USD. Therefore, sunk costs have to be considered before a CRM solution chosen. Switching between systems and solutions is merely impossible and not economically justifiable towards taxpayers. Furthermore, a rise in quality of service and information transparency can lead to an increase in its use, raising costs by enlarging facilities or staff.

CRM systems rely heavily on databases and establishing connections to legacy systems (Foss, Stone, & Woodcock, 2003). To be efficient, information systems need to exchange data horizontally and vertically on all state and agency levels. Front and back-offices have to be integrated to offer a "closed loop" environment. A certain level of standardization is required. There needs to be more research on how far (state levels, standardization) and where (authorities, services, type of data) this is feasible. The idea runs contrary to the general understanding of federalism and call for subsidiarity particularly at the local level. Virtually, institutional boundaries would be removed. This conclusion is also true for e-government. However, the chances of creating more, rather than cutting red tape are high if we consider a paper by Peled (2000).

A government connected at all state levels (a term being used is joined up government (National Audit Office, 1999; Pollitt, 2003) and data bases with citizen profiles is on the one hand much more efficient and implies major improvements but raises a vast array of questions from a democratic viewpoint. These include questions on controlling data access and how to protect it and again on the effect of the role of the citizen within the state. At its very core, such a scenario also underpins the collectivist

*Table 1. Major differences between private and the public sector CRM environment*

| Private Sector CRM | Public Sector CRM |
|---|---|
| Competition (some) | Monopoly |
| Market orientation | Jurisdiction |
| Million relationships | Billion relationships |
| Homogeneous product range / controllable quantity | Huge number of heterogeneous products (services) / uncontrollable due to political decision making |
| Personalization | "One size fits all" |
| Segmentation (Pareto rule 20-80) | Segmentation possible/no termination of unprofitable citizens |
| Processes flexible | Processes static |
| Budget/sunk costs | Budget/sunk costs |
| Legacy systems (IT) | Legacy systems (IT) |
| | Poor service image |
| Organization culture | Organization culture |
| | Human resources (lack of knowledge, salaries not competing with private sector) |
| Laws | Laws |
| | Federalism |
| | Political influence (planning cycle) |
| Profit orientation/maximising the shareholder value | Democratic understanding |

concept of citizenship, which places primary needs on the broader needs of society and social justice rather than the narrow needs of individuals. Another are of concern is that if citizens and their demands are better understood politicians might misuses this as a source of power. Table 1 summarizes major differences between in the private and the public sector and the constraints on the use of CRM.

## FUTURE TRENDS

Citizen Relationship Management offers new opportunities for local government (borough, city, county) in the next years. Cases like New York City or Miami/Dade County are first indications where developments are heading. In general, there is not enough data available. Besides various operative aspects like channels, data analysis or technologies research needs to focus on inter-organizational arrangements and the use of information in decision making. Does CiRM and e-government lead to a new form of government and governance or are they just enhancing the status quo?

## CONCLUSION

I argued that former attempts of improving citizen orientation in the public sector have partly failed. E-government and CiRM share many objectives, tools, implications and to a certain extent the role of ICT. Indeed, CiRM adds a clear customer strategy to e-government. As demanded by Marshall (1990) CiRM and its bidirectional channel character can enhance citizenship in the administrative process. So far e-government falls short of providing researchers and professionals with a concept on creating a citizen oriented organization and public services. This is where CRM fills the gap. Implicitly or explicitly, ICT can not be the main driver of internal change processes. However, the use of ICT combined with external pressures (constituents) has change potential but may also fail due to the same reasons NPM did not meet its expectations: the logic of bureaucratic politics and multiple stakeholders within the government sphere. Instead of theoretic disquisitions on a brave new CiRM or e-government world we need more empirical evidence on many aspects of public administrations and public services to approach the obstacles in an appropriate way. The most pressing issue is the structural change of the state which is inevitable if we want to truly benefit from CiRM, ICT and other concepts. In this regard, many questions concerning understanding, ownership, control, use, responsibility, collaboration, laws, processes, and costs have to be answered by research.

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## KEY TERMS

**311:** The number was approved by the U.S. Federal Communications Commission in 1997. It is a single point of contact call centre for all non-emergency public services.

**Citizen Relationship Management (CiRM):** A strategy or management approach enabled by technology with a broad citizen focus to maintain, optimize relationships and encourage citizen participation.

**Customer Lifetime Value (CLV):** Model to measure the customer value over time. Present net value and expected future value minus costs associated with a customer.

**Customer Relationship Management (CRM):** A holistic management approach enabled by technology with a broad customer focus to start, maintain, optimize relationships and make customers more loyal/profitable. CRM requires a customer centric business philosophy and culture to support effective marketing, sales. and service processes.

**Enterprise Resource Planning (ERP):** Software solution to assist organization with all aspects of operational planning

**Online Analytical Processing (OLAP):** Approach and tool to analyze complex queries of multidimensional databases. It belongs to the broader family of business information tools which include data mining or relational reporting.

**Total Quality Management (TQM):** A set of management and control activities based on statistics, leadership of top management and involvement of all departments and levels of employees aimed at quality assurance and citizen orientation.

# The Civic within the Democratic Project in the Digital Era

C

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## INTRODUCTION

In 1819, Benjamin Constant gave a speech at the Athenee Royal in Paris on how conceptions of liberty changed from the time of the Athenian polis to 1819. After a period of revolutionary upheaval in the United States and France, observed that in the ancient world citizens defined liberty in terms of their positive participation in the affairs of government, while in the modern world, citizens define liberty in terms of the freedom to secure the desires of their private lives. Constant (1988, p. 325) argued that "in the kind of liberty of which we are capable, the more the exercise of political rights leaves us time for our private interests, the more precious will liberty be to us." The additional point that can be inferred from Constant (1988) is that democracy is an unfinished and on-going project that needs constant and continuous attention (Habermas, 1996). Others challenge Constant's (1988) positive outlook and argue that the legitimacy of modern governments is in critical decline, citing falling public confidence and flagging interest in the democratic process (indices which include the low percentage of the electorate that votes; mistrust of politicians; cynicism about the political process and public scandals).

Certainly one modern day determinant that will influence the shape and identity of democracy is the regeneration of information and communication technologies (ICT). The information era is based on the pivotal role of ICT, which now pervades all sectors of society—the public sector as well as the commercial and voluntary sectors (van Dijk, 2001). ICT-based applications provide a new way for citizens to participate in the democratic process through improved

- **Interactivity:** Two-way communication/debate between citizen and government
- **Speed of Communication:** Offering the possibility for politicians to rapidly obtain impressions of citizen's opinions
- **Reach of Scope:** Providing links from politicians to groups with which they were not previously in contact

On the positive side, ICT enthusiasts foresaw the Internet creating a public space free of interference, both from government control and commercialism. They proposed that new "information highways" facilitated by ICT will open alternate pathways to democratic participation, namely electronic democracy comparable with Jefferson's (1984) vision of 1834, involving a network of highways which would open new lines of communication between the American States cementing their union by "new and indestructible ties." The Jeffersonian vision is captured by today's "amplification theory" of technology, holding that ICT enables citizen participation, inducing qualitative changes in society (Agre, 2002). However, ICT also poses threat, a new form of control. Electronic surveillance of the work place is particularly effective because it is *reflexive*—"management" monitors workers as well as itself (Whitaker, 1999, p. 40). At the societal level, it creates and re-creates new structures and new futures. These newly emerging structures, although variously named as "Virtual Feudalism" (Mowshowitz, 1997); "Post-National State" (Whitaker, 1999); "New Serfdom"; "IT-Harems" (Korac-Kakabadse, Korac-Kakabadse, & Kouzmin, 2000) or "New Shoguns," all depict increasingly invisible, all-seeing, all powerful control mechanisms, first envisaged by Bentham's 1 Eighteenth-Century (1787/1995) "Panopticon," depicting citizens loss of freedom. The Panopticon vision of totalitarian, electronic control, is a compelling metaphor because it represents the architecture of modern power (Whitaker, 1999, p. 28). In the

*Table 1. Fundamentals of the Democratic project (Compiled from Kakabadse et al., 2003)*

| Components | Role/Function |
|---|---|
| Democratic Principles or Values | Underlying principles or values which define democracy--such as liberty or rights (*liberté*), equality (*égalité*), communality or brotherhood (*fraternité*), and other socio-economic values. |
| Democratic Processes | Political and governing processes which uphold and support democratic principles--such as free elections, voting, referenda, and participation. |
| Democratic Organs | Mechanisms that support the implementation of democratic processes—legislative, executive, and judiciary. |

information age, the global political economy (globalizing markets) and its major tenants—corporate business and its representatives and lobby groups, exert unprecedented power on sovereign states to introduce "business-friendly policies" which, in turn, lead to (Korac-Kakabadse et al, 2000; Mowshowitz, 1997):

- A retreat of the State (via privatization, outsourcing, and the hollowing out of public functions) and an increase delivery of public services by private parties which exercise authority in their own name rather than in the name of the law which transcends their own power
- A blurring of lines between public and private sectors
- Growing disparities between wealth and poverty and between and within regions and communities (e.g., fortress and affluent suburbia versus desolated quarters)
- A growth of private security and "private justice"

These increasingly business-friendly policies lead to corporate control over impoverished, sovereign governments and the transformation of "citizens" into "customers." The process of being rendered a "client," diminishes the value of citizen rights and equity, as clients with higher disposable incomes can afford to procure higher levels of rights and opportunities. A growing literature highlights that

ICT-mediated democratic relationships are not challenging the fundamental ordering of democratic processes but, rather, traditional bureaucracies are being replaced by "infocracies" as explained by technology "reinforcement" or "enactment" theory emphasising how ICT further reinforces existing power and social control structures (Agre, 2002; Fountain, 2001; Korac-Kakabadse, 2000). New ICT reproduces and strengthens institutionalised socio-structural mechanisms, "even when such enactments lead to seemingly irrational and ostensibly sub-optimal use of technology" (Fountain, 2001, p. 5).

## BACKGROUND

### Models of Democracy

General public opinion is the both the cause and the effect (i.e., the vehicle and the organ) of legislative omnipotence or the power to govern. The opinions of average citizens take on a public significance which is of real consequence in a State in which the idea of popular sovereignty is operative. In discussion about democratic models of governance, Kakabadse et al. (2003) distinguish between *democratic principles*, *democratic processes,* and *democratic organs* (see Table 1), arguing that in order to uphold democratic principles there is a need to re-invent the democratic process.

Appropriate for the ICT age, Kakabadse et al. (2003) identify four distinctive models of Electronic Democracy (see Table 2).

However, while the first three models of electronic democracy are increasingly being implemented in various forms in a variety of countries, they have been adapted to the existing models of democracy (see Table 3). In contrast, the fourth form of democracy, Civil Society, is an inspired form, which resembles Athenian participatory democracy mediated by electronic means**,** namely ICT mediated deliberative democracy.

### Media Control

Habermas (1996) posited that the "public sphere" can politically function only if citizens accommodate or generalise their interests together so that "state power is

*Table 2. Models of electronic democracy (Compiled from Kakabadse et al., 2003)*

| Model | Example | Characteristics |
|---|---|---|
| Electronic Democracy (political communication in the public sphere facilitated by ICT) | Electronic Bureaucracy | Electronic delivery of government services which support the existing model of government to government (G2G), government to citizens (G2C), and government to business (G2B). |
| | Information Management | Electronic means which enable citizens to register their views on particular issues (electronic registers, e-mails). |
| | Populist | Electronically-supported inter-activity as a policy process (town halls; forums and referenda) and includes advocacy, lobbying, and public consultation. |
| | Civil Society | Transformation of political culture to participatory democracy or inter-active democracy. |

*Table 3. Models of democracy (Compiled from Finer (1999); Kakabadse et al., 2003)*

| Model | Example | Characteristics |
|---|---|---|
| Athenian Participatory Democracy | Athens in 5th Century BC | • All free male citizens, over 30, directly participate in the decision-making process and the passage of law<br>• Citizen initiative<br>• Only a genuine majority of the population can make a law which really maximizes the democratic nature of rule<br>• Separation and division of powers between four organs (*Ekklesia* or Legislative, *Boulé* or Executive, *Magistracies* or Administration and *Dikasteries* or Courts)<br>• No political parties |
| *Respublica* | Roman Republic | • Membership to governing bodies depends on a property qualification—an oligarchy of aristocratic families<br>• No political parties but groups of leading political figures and their followers (*Optimates, Populares*)<br>• Constitutional democracy with mixed separation of powers<br>• Supernumerary organ—the *Senatus Consultum* (consultative)<br>• Organ of two assemblies—*Comitia Centuriate* and *Comitia Triubta*<br>• "Anti-organ" of two assembles—*Tribunals* and *Coniclium Plebus* |
| Direct Democracy (government by the people) | Switzerland (since 16th Century) | • Federal states where Cantons (provinces) have more responsibilities than the Confederation<br>• Legislating by *Plebiscite* (initiation by high level of state body), *Referendum* (permanent constitutional institution that can be initiated from top or bottom: administrative, executive or parliament) and<br>• *Popular initiative* or *counter-project* (initiated by civil society)<br>o Host of ordinary policy questions are routinely put to the electorate for their opinion<br>o For a Referendum to be accepted, it must obtain the majority of elector's votes<br>o For an initiative to be adopted, it must obtain a majority of the electorate and of the Cantons (double majority)<br>• Citizen can use petition to any authority |

*Table 3. Models of democracy (Compiled from Finer (1999); Kakabadse et al., 2003) (cont.)*

| | | |
|---|---|---|
| Representative Democracy (government by elected political elites based on indirect rule by the majority of the electorate) | UK (Westminster Parliamentary System) | • Serving in law (or crown in parliament)—unwritten constitutional issues (no formal Bill of Rights)<br>• Bi-cameral system of houses (House of Lords and House of Representatives)<br>• Division of power between Legislature and Executive but separation of powers from the Judicial organs of government<br>• Tight party discipline controls on how elected 'representatives' vote in the Commons<br>• The Prime Minister can wield power with the acquiescence of his/her Cabinet<br>• "Majoritarian democracy" (two big, cohesive parties compete for power: Conservatives and New Labour)<br>• "Actual" representation (elected representatives have a trustee relationship with their constituency)<br>• Elections based on principle of "first past the post" ( the winner takes all)<br>• Referendum can be used to explore public attitudes |
| | USA (Presidential or Congressional System) | • Constitutional system with a written Bill of Rights<br>• Bi-cameral system of chambers (Senate and House of Representatives)<br>• Formal separation of legislative power between Legislative, Executive and Judicial organs of government<br>• The President, as head of the Executive, has full and actual power in decision-making processes to the point of being an "Imperial Presidency"<br>• "Majoritarian democracy" (two big, "coalition" parties compete for power: Republicans and Democrats)<br>• "Virtual" representation (elected representatives have a binding relationship with their constituency)<br>• Elections based on "proportional voting" principle and "district system" (the winner takes all)<br>• Referendum can be used to decide policy issues (e.g., California) |
| | All other democratic societies | • Multitude combinations and variations of the above two models contextually re-defined (Netherlands' consensus model: a multi-party system with proportional representation) |

transformed into a fluid medium of society's self-organisation" (p. 231). Within such a context, the media plays an important role by providing independently informed views on public issues for citizens to debate through "reasoned argument" accommodating a variance of opinion.

However, ownership influences over the information being communicated through the media is an institutional and economic phenomenon. Information authenticity is dependent on those interests who create, present, store and/or retrieve information (i.e., their subjective interpretation). Although, subjectivity is not problematic within a pluralist democracy, the concentrated ownership of communication channels, in the form of oligopoly and/or monopoly control is deemed problematic (Habermas, 1996; Held, 1989). The role of the media (television, magazines, newspapers, and internet) in the modern democracy has been seriously questioned as it now appears to operate in favour of the "commercial good" rather than the "common good." Media control is contrary to democratic principles where the true art of democratic persuasion requires debate and interaction. Some authors have argued that manipulation that creates attitudes and beliefs, chosen in advance by vested interest elites, is carried out at two levels–"grassroots and treetops" (Carey, 1997). The power of rent-seeking, organized interests induces one, two, or all three organs of government to infringe both on citizen rights and public welfare (Held, 1989; Kakabadse & Kakabadse, 2001; Mosher, 1980). Whether the media is technically classified as "public" or "private" is immaterial as how resources in the media are controlled and how that control is determined, is the critical consideration.

In contrast to the aspiration of expanding knowledge and freedom, democratic culture and eroding monopolies of knowledge, ICT creates "several traditions of control: the press, the common carrier and the broadcast media" (Kapor, 1993, p. 174). Neuman (1991) and others (Kakabadse et al., 2003) argue that "in the industrialized nations of the Twentieth-Century, the democratic polity cannot function as such without the institutional struc-

ture of independent mass media" (p. 133). Thus, there is a need to legislate for the "free communicative" organ to ensure democratic processes take place–free elections, transparency and informed citizen participation (Andersen, 1995). If a sum comparable to the U.S. 2004 Presidential election of U.S. $1.6 billion had been spent on improving democratic structures, electronic voting and voters list, the role and influence of "soft and big" money which undermines the political scene, would be minimised.

## FUTURE TRENDS

Opportunity for Participative (and Interactive) Democracy

Although the percentage of citizens voting in general and local elections in the USA, Canada, and UK has declined, in the UK for example, there has been a growth in other forms of popular voting. Citizens, in greater numbers, vote in radio polls, Internet surveys, and television shows. They vote on serious programmes such as Question Time, Restoration, and the Big Red, as well as on light entertainment programs such as Big Brother (Coleman, 2003). They vote by phone calls, text messages, e-mails, and Internet Web sites. Although such voting does not precipitate social change, it does indicate an undercurrent of public will to participate in deciding things as a collective body when it is perceived that the issues are presented clearly and with alternatives spelt out. As Burke (1949) poignantly observed, "in free countries, there is often found more real public wisdom and sagacity in shops and "manufactories" than in the cabinets of princes in countries where no one dares to have an opinion until it comes to them" (p. 106).

For example, a study over ten years, based on VOX survey following Swiss federal elections (June 1981 to June 1991) and designed to measure the decision-making capacity of Swiss citizens, reveals a fair degree of awareness of the four types of basic knowledge deemed necessary for voting (Walter, quoted in Popa, 1998). Swiss citizens scored highly on Knowledge of Project (81.5%), Result of the Vote (79.5%), Content of the Voted project (78.6%) and Watchword on Voting (68.5%) (Walter, quoted in Popa, 1998, p. 143).

Thus, in order to exercise citizen discretion, individuals need a diversity of information rather than carefully-crafted and continuously-repeated messages through a variety of communicative channels. Citizens need a diversity of message content irrespective of the means of communication rather than the same message content delivered in a variety of ways—a technique now used by many ruling parties of democratic, and other, forms of governments. In order to ensure for democratic prosperity, constitutionalising the new organ of the democratic project, namely information, addresses the shortage of free space in which the public sphere is positioned. Whether citizen will to participate is harnessed or not, is open to choice. Dewey (1927) observed that systems of public opinion formation are essential to the organization of power and the "smoothest road to control over political conduct is by control of opinion" (p. 182). Dewey (1927) argued that "only when we start from a community as a fact, grasp the fact in thought so as to clarify and enhance its constituent elements, can we reach an idea of democracy which is not utopian" (p. 149).

## CONCLUSION

Whether the so-called "Jeffersonian Vision" which has inspired contemporary politicians to extol the reputed democratic potential of the communications revolution, and expressed as a belief in the power of public opinion, prevails or whether Bentham's (1787/1995) vision of the "Panopticon" prevails, is open to choice. Jefferson (1984) proclaimed "I know of no safe depository of the ultimate power of the society but the people themselves, and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion" (p. 493)—emphasising the importance of the diversity of information. To ensure the future of democracy, whether electronically mediated or not, it is strongly argued in this paper that a fourth organ of the democratic process—"communicative action" (Habermas, 1996) is created, guaranteeing a plurality of communication channels thereby distinctly diminishing ICT control in the hands of the few.

There is no telling what the interactions of a newly-enabled, global, public (even if electronically controlled) participation in a variety of linguistic and cultural traditions, will create in time. However, it is clear that the understanding of citizenship in a world of nation-states is undergoing transformation which, in turn, will transform the world of nation-states, for better or worst. The clock is ticking! Concentrated ownership of media and other resources within global contexts, the ongoing construction of new, global institutional structures and the decreased will to finance a public utility for the re-generation of democratic values and processes which will ensure independence, openness and freedom for citizen participation, is rapidly moving towards institutionalized ICT and media regimes.

How might, and how should democratic principles such as rights and freedoms of "new speech" (the many ways of sharing multi-dimensional worlds of sight, sound

and touch over invisible and ubiquitous "terabyt" highways) be applied in the era of the information superhighway needs to be examined (Agre, 2002). As Winner (1987) observes, "political ergonomics" will need to be reinvented in order to design new arrangements for democratic praxis and effective governance in the forthcoming digital age. E-democracy is yet to resolve the explicit tension between the Jeffersonian "civic" impulse and Bentham's Panopticon imperative underlying the digital Democratic Project. The design of new arrangements for democratic praxis and effective governance in the forthcoming digital age remains a challenge.

Current use of ICT promulgated as e-government exposes the structural obsolescence of our current bureaucracy. The possible creation of a "virtual state," (Fountain, 2001) may lead to further centralisation of control or provide citizens with the opportunity for self-determination. The struggles over privacy, accessibility, and equity pose will likely determine the extent to which governments "will be recast in the information age and whether citizens will emerge as winners or losers" (Fountain, 2001, p. 203). Hence, there is a need for the re-articulation of democracy and its institutions in order to address the challenges of a digital era.

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## KEY TERMS

**Benthamanian Vision or "Panopticon":** Based on reinforcement theory, Bentham's Panopticon perspective provides a conceptual platform which emphasises that ICT provides mechanisms for reinforcing existing power structures and social controls.

**Communicative Action:** The "Chicago school" notion of communication highlights a process in which people create a culture supportive of rational-critical debate and collective decision-making conscious of alternative courses of action which facilitate self correction.

**Democracy:** Democracy is a form of social order involving citizens in a process of participative decision-making with the intention of generating a free and enriching civic base.

**Electronic Democracy:** Electronically-mediated political activities that are embedded in larger social processes, where ICT itself is only one element of an ecology of communication media and social life.

**ICT Mediated Deliberative Democracy:** Aims to increase the quality of democratic judgment through widespread citizen participation facilitated by ICT in multiple public spheres, both within and between the institutions of state, economy and civil society.

**ICT Role:** The role and effect of ICT requires understanding the social processes that surround it as well how the interaction between technology, organisation, and individual is experienced.

**ICT-Mediated Communication:** Structured a-synchronous communication supported via computer-mediated messaging systems that use multi-media processing and communication tools to provide high-speed information exchange (e.g., electronic mail; web-based tale-conferencing; Group-Ware, "public net-work").

**Media Control:** The concentration of media ownership is considered to pose a threat to democracy as communications technology can be used to manipulate the beliefs of people instead of "informing their discretion." Powerful individual owners of large conglomerates influence media output significantly, promoting their interests by "manufactured consent."

**"Jeffersonian Vision":** In terms of functional amplification theory, Thomas Jefferson's vision concerning the power of public opinion and democratic deliberation, the foundations for popular sovereignty, can be realised through ICT facilitating self-governing communities over a vast territory.

**Re-Vitalising Democracy:** On the basis that "the cure for the ills of democracy is more democracy's…may also indicate the need of returning to the idea itself, of clarifying and deepening our apprehension of it, and of employing our sense of its meaning to criticise and re-make its political manifestations" (Dewey, 1927, p. 144).

## ENDNOTE

[1] According to Bentham (1995), the Panopticon ("all-seeing") was designed as a round-the-clock surveillance machine that ensured that no prisoner could ever see the "inspector" who would conduct surveillance from a privileged central location within a radial configuration. The prisoner would never know when he was under surveillance, creating mental uncertainty that in itself would prove to be a crucial instrument of discipline as one is totally seen, without ever seeing those who observe.

# Civil Servants' Resistance toward E-Government Development

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## INTRODUCTION

As the new UNPAN E-Government Readiness Report (2004) stated, during the last years, governments worldwide have made rapid progress in embracing information and communication technologies for electronic government. All over, several projects have been carried out in order to offer more and better information to citizens and to improve public service delivery. Nevertheless, not all of them have been successful. Several factors have restrained governments at all levels from implementing thriving e-government initiatives.

Research has shown that workers' resistance to change is one of the major obstacles that organizations face when trying to implement innovation change processes. The public sector is not an exception. Due to its intrinsic characteristics, the introduction of information technology and, particularly, of electronic government programs requires paying special attention to the potential crisis situation to which these initiatives could lead. The intention of this article is to make clear how public servants experience and react to those changes that result from the adoption of information and communication technologies (ICTs) within the public administration; that is, to analyze the people dimension of change.

## BACKGROUND

More and more, governments and public administrations are getting used to the new tools brought about by the new information era. The Internet and a growing array of information and communication technologies have modified widely the possibilities for organizing the government and the state. In particular, digital government projects have become a powerful way to contribute to public administration reform and modernization processes that have been taking place in many countries during the last two decades.

Indeed, electronic government has the potential to cut transaction costs all the way to zero in some cases (Fountain, 2001) and, therefore, to obtain efficiency gains, to become more transparent, to reduce corruption, and to enhance public service delivery. In short, it may lead to a more citizen-oriented government that offers an improved range of services and that, in return, increases the level of satisfaction among the population as well as the acceptance of the public sector (Bertelsmann Foundation, 2002).

It has been argued that, despite all its latent benefits, electronic government initiatives failure (total or partial) is far more prevalent than success. From analysis of both theoretical and real-world examples, Heeks and Bhatnagar (1999) concluded that the root causes of this situation are seen to lie in what they called conception-reality gaps; that is, those gaps that exist between the way in which digital government projects are conceived and the realities into which they are introduced.

In a sense, electronic government initiatives are not different from any other government actions, which means that they also are subject to unintended consequences that fundamentally are due to the adoption of imitation strategies on the one hand and to the introduction of change processes into a particular type of institution—the bureaucratic one—on the other hand. These two variables represent two conception-reality gaps. Thus, when the conceptual model does not take into consideration both the environment and the organization implementation context, electronic government programs tend to fail.

As Heeks and Bhatnagar (1999) put it, all information technology projects operate within a change context that has two main components. The first refers to the wider environment outside of the organization. It is characterized by the presence of other institutions, a specific level of development of new technologies, a particular state of the economy and the markets, several political pressures, or a variety of cultures and other social systems. That is why electronic government projects developed within the framework of a particular geographic context have to cope with the challenges of that specific country, region, or city. Imitation strategies that generally have been indifferent to economic, social, and political systems usually have been unsuccessful. For example, "a patient information system was developed in the US to support improved health resource management. When similar reforms based around IS were introduced in the UK, they ran into

difficulties. British nurses found it hard to use the new information system because of the U.S.-inspired assumptions it made about the planning and costing of patient care" (Heeks & Bhatnagar, 1999, p. 69).

Even greater can be the problems of transfer from more advanced countries to developing ones, such as the failure of several public administration reform processes in Latin America or other regions of the world already have shown. The World Bank and other international institutions support has depended on the attention paid by the beneficiary countries to those IT policies considered as the correct ones by the lending organizations. This coercive isomorphism has been accompanied by a mimetic isomorphism, which implies that the political and economic elites who have been trained in the United States or in Great Britain have considered these countries' electronic government initiatives as examples to follow. As a consequence, important attributes, such as an inadequate technological infrastructure, an unstable political environment, a limited local skills base, an important restriction on money, or a wide acceptance of patronage practices, have not been taken into consideration when designing digital government solutions. This lack of knowledge frequently has led to partial or total project failure.

The second component that Heeks and Bhatnagar (1999) cited is the organization within which the technology is located. This has an organizational culture, a political dimension, a set of overt or covert management strategies related to change, and both formal and informal structures. Specifically, the public organization is a bureaucratic one. Therefore, electronic government initiatives are necessarily conditioned by the obstacles and problems to which this type of structure gives rise, such as referring all political decisions to the law, stressing a culture of legality, emphasizing senior public managers' control over extremely predictable and rational processes, impeding adaptation to new times as a result of its slow nature, and avoiding quality-oriented structures (Gascó, 2005).

This assertion explains why private sector information technology practices that have proved to be successful often fail when they are transferred to public administration. Failure is not only a consequence of the broadly studied and analyzed dissimilarities that exist between the private and the public sectors, such as pursuing different objectives, being accountable to different stakeholders, or having different types of customers (Allison, 1983), but is a consequence of the prevailing public administration culture. In sum, "government is not a business. Forcing governments into private sector thinking usually causes more problems than it solves" (Osborne & Gaebler, 1992, p. 20).

## PUBLIC OFFICIALS' RESPONSES TO INNOVATION: RESILIENCE TO CHANGE

C

The difficulties that arise from the implementation of imitative electronic government strategies within the bureaucratic public organizations give rise to feelings of fear, anxiety, and uncertainty among their employees, which minimizes the likelihood of project accomplishment. Although, generally speaking, resistance to change has been widely accepted as a natural reaction, it is cited, however, as one of the major obstacles that the public sector faces when trying to implement any sort of change (Kearns, 2004). Just as any other government program, digital government initiatives can lead to failure due to the public servants' negative responses and attitudes about the changes being implemented.

Private companies also may be affected by resistance to innovation projects. Nevertheless, the two conception-reality gaps mentioned in the previous section in relation to the introduction of electronic government programs aggravate the public sector employees' resistances to change in comparison to the opposition experienced by the private arena staff. Although it is important to notice that imitation policies usually do not bring about the necessary commitment from the upper and middle public managers (they are often perceived as imposed strategies), reluctance to electronic government projects is mainly the result of the public sector bureaucracy's attributes. Thus, its job definition and tasks precision, its routines and procedures uniformity, its hierarchical structure, its isolated departments, its organization continuity, its risk aversion, and its reliability are some of the bureaucratic structure characteristics that give rise to a close system based on certainty and exact prevision, a system that is perceived by its members as a stable and secure one (Gascó, 2003, 2005).

Given this environment, the introduction of electronic government actions may result either in resistance to change due to a lack of clear evidence about its positive impact (Heeks & Davis, 1999) or technology enactment in ways that reproduce, preserve, or even strengthen the ongoing social relationships and performance programs (Fountain, 2001, 2002). Since the use of information technology generally leads to uncertain and unexpected organizational changes, the most common reaction to innovation projects is distrust. Kearns (2004) maintained that organizational change usually is related to information technology and can take many forms. According to her, technology may provoke changes in service delivery, business processes, people's roles and responsibilities, or structures and facilities.

Some of the more important resistance-to-change issues brought about by the implementation of digital government projects are as follows:

1. **Loss of Jobs:** Wirszycz (1997) noted that there is continuing evidence of a fear among employees that the introduction of computers will lead to a loss of jobs. Because technological change is implemented recurrently to automate internal processes, it often is regarded as a senior management pretext to downsize or to cut back on overtime hours. Along with the added stress from being asked to master the technology, this fear is a significant force hindering the move toward improved public service delivery. Many other authors have supported this statement; among them are the Working Group on E-Government in the Developing World (2002) and Fountain and Osorio-Urzua (2001). Public servants' unfamiliarity with technology accentuates this perception, because they may feel that their skills and expertise will become redundant and that they will not be capable of developing the new abilities and behaviors that the new electronic government initiatives may require. Particularly in Spanish or Latin American contexts, where stability has resulted in life jobs and, therefore, in aging workers not used to transformation processes, this view has become a remarkable obstacle that hinders change.
2. **Resistance to Cooperate:** Most of the electronic government initiatives that are being implemented require a stout collaboration among different departments within the public administration. This is so, because these kinds of programs are transverse and affect the functioning of several areas (Danish Technological Institute & Institut für Informationsmanagement Bremen, 2004). Nevertheless, in the bureaucratic public sector, departments operate as Taifas kingdoms,[1] which means that they are reluctant to share information and to work together, and that they view other units as competitors for resources and control. The existence of several subcultures within the public sector (scientists, politicians, and bureaucrats) reinforces this behavior. Each of them tends to "(a) require different data, information, and knowledge to do its work; (b) have different abilities and propensities to collect and acquire its own data; (c) gather data about the world in different categories, using different metrics that have specific and not always easily translated meanings; and (d) have different requirements for and uses of the outputs of its information. … As a result, each subculture sees itself with different roles in, contributions to, and purposes for its value chain; these differences can lead to challenges in coordinated and productive information sharing" (Drake, Steckler, & Koch, 2004, p. 68).
3. **Lack of Clear Leadership:** The previous situation results in another effect. To keep everybody content, several people are assigned to a project group that actually leads to a situation in which there is certain confusion about who really is in control of the electronic government initiative. The need of a leader is important from an operational point of view. As stated by the UNPAN (2003), "the chief executive officer of the public sector must be committed to e-government, lead and build broad support for it, and be eager to learn. This generates the all-important positive signals that the civil service needs to receive from its top leadership" (p. 9). However, political and senior management's strong commitments may not always be easy to attain. Two facts lead to this conclusion. On one hand, electronic government strategies still are considered new within public administration (education or health policies have been implemented for decades; it is obviously not the same with digital government programs). On the other hand, the vast majority of electronic government projects has not yet achieved their objectives and, therefore, has not clearly been evidence for all their proclaimed benefits.[2] As a consequence, skepticism has been a widespread attitude among public sector top managers who, in response, have chosen to be cautious when acclaiming ICT projects.
4. **Reform Fatigue:** The public sector has had more than its fair share of reform projects fail. This past experience also has shaped the perceived value of benefits and, therefore, has promoted a behavior against change (Gascó, 2005). In Bourn's (2002) words, "the history of government information technology has led to a poor IT culture for many government organizations, arising from a previous bad experiences with IT projects or procurement. … Previous experience of ICT projects that ran over budget, brought few costs savings or even failed to work altogether can lead to reluctance to invest in web-based technologies. … Alternatively, the organizational response to previous bad experience with IT can be a 'hands-off' approach by all staff outside the IT department, because they do not want their careers tainted through association with any more disasters" (pp. 3-4). Thus, past heritage conditions new projects of change.
5. **Deficient Telecommunications Infrastructure:** As explained in the preceding section, magnificent digital government projects that have succeeded somewhere else are undertaken in context with different premises. Too often, the available IT in-

frastructure is not taken into consideration when designing digital solutions. Under these circumstances, which usually give rise to important delays and unpredicted difficulties, even the most committed employee may develop a feeling of frustration and, therefore, of resistance to change. Other concerns can be found when reviewing electronic government literature, such as fear of extra work (i.e., during the earlier stages of a project, legacy technology may need to run in parallel with the new system) or inappropriate use of outside consultants and contractors (due to the public sector inexperience with IT, digital government projects too often are introduced and managed by third-party teams and contractors and consultants). Nevertheless, the intention of this section has been to highlight those matters that have been addressed more commonly.

## FUTURE TRENDS

Electronic government projects are underway almost everywhere in the world. More and more, governments are exploring the possibilities that information and communication technologies offer in order to build a better-quality democracy and to deeply change public administrations. But in order for these to be successful, civil servants' engagements are needed unquestionably. That is why the future design of digital government plans must include specific actions in order to obtain public employees' commitments.

Much has been said about how to overcome those feelings and perceptions that result in reluctance to change when electronic government or other types of programs that involve the use of information and communication technologies within the public sector are implemented. Gascó (2005), for example, stated that, in fact, the classic organization theory recommendations about how to deal with change in private companies also are suitable in the public context. Thus, education and communication strategies, support, negotiation, and participation must accompany the technological innovation transformations, considering that long-time bureaucratic behaviors cannot be eradicated with isolated short-run courses of action. Yet, despite the validity of these general and broad proposals, change management in public organizations must take place in specific ways.

First, there is a need for proper and complete information about the project to be undertaken. Communication is an essential motivational exercise aimed at gaining support and understanding of the workforce. That is why the communication plan has to take into consideration the following elements:

1. Both written and verbal communications of the facts have to take place before the initiative actually starts.
2. The extent to which communication is successful depends on the communication skills of the participants and the degree of common grounding in the lexicon shared by them. The effective transaction of knowledge and ideas may be hampered by fundamental differences in professional subculture grammars (Drake et al., 2004; Vann, 2004).
3. The language of external consultants, often hired as agents of IT change, is fundamentally opposed to the language of public agencies and departments (Vann, 2004).
4. Electronic government leaders might find that their listening abilities are more important than their abilities to communicate their own perspectives on the change to employees (Piderit, 2000). Dialogue and conversation should take place more frequently than top-down information display. In addition, innovation should be marketed. However, overselling the benefits of IT projects may not be effective in securing employee support, if employees already accept that the new programs will have some positive outcomes but feel that a different perspective is required (Piderit, 2000).
5. Public servants' responses to change may evolve over time. Paying attention to this evolution implies constantly reviewing the message that is communicated.

Second, training ought to take place. But education strategies must focus on two aspects. On the one hand, instruction has to be concerned both with keeping skills up and with sending cultural messages throughout the organization. As a consequence, computer literacy cannot become the only goal to pursue. On the other hand, people who are going to be sent to training should get involved in real projects. Public administration managers too often have abused learning and have adopted it as the only solution to overcome resistance to change.

Finally, planning for change is an imperative, as it may allow one to gain control over the uncertainties inherent in the change process as well as to ensure backout strategies and rollback abilities in the event of serious unforeseen problems (Kearns, 2004). The certain and secure public sector context should allow for these types of arrangements.

## CONCLUSION

The need for efficacy and efficiency has given rise to multiple attempts to reform and to modernize the public sector. During the last years, a new tool—information and communication technologies—has become available to do so. Its adoption within the public context often has resulted in the design of digital government initiatives. Nevertheless, many of these new programs have failed totally or partially. The existence of conception-reality gaps, which refers to the disparities that exist between the way the projects are conceived and the public sector realities in which they are introduced, has been said to explain these breakdowns. Particular emphasis has been placed on the bureaucratic attributes of public organizations and on the ensuing resistance of change to which they may lead.

This article has endeavored to claim that reluctance to change is a common and natural phenomenon when introducing information and communication technologies into the public sector. For that very reason, the biggest challenge to creating electronic government or even just installing a new IT system is not the technology but the cultural changes that must be made to accommodate it.

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## KEY TERMS

**Change Management:** The process, tools, and techniques used to manage people effectively and the associated human resource issues that surface when implementing change.

**Conception-Reality Gap:** A gap that exists between the way in which reform is conceived and the public sector realities into which it is introduced.

**Electronic Government Initiatives:** Those actions based on information and communication technologies (particularly, the Internet) carried out in order to increase public sector efficiency, to improve citizen-oriented public services, and to provide a more transparent performance network.

**Organizational Change:** The design and implementation in a deliberate way of a structure innovation, policy, new goal, or operational transformation.

**Partial Electronic Government Failure:** Electronic government projects that are implemented but have something wrong with them (e.g., unattained goals or undesirable outcomes).

**People Dimension of Change:** How employees experience and react to change processes.

**Resistance (or Resilience) to Change:** A restraining force moving in the direction of maintaining the status quo.

**Total Electronic Government Failure:** Electronic government projects that are never implemented or that are implemented but soon abandoned.

## ENDNOTES

1 The Taifas kingdoms were small Spanish realms that resulted from the disintegration of the Caliphate of Cordoba in 1031. This expression is generally used to illustrate the independent functioning of departments or areas that are close together geographically but do not have any relationships among them.

2 Because of the bureaucratic nature of public sector organizations, initiatives and goals undertaken within this context take a long period of time to achieve. One of the features that particularly boosts process slowness and results delay is overregulation, that is, the need to fulfill too many laws and procedures in order to implement a project of change.

# Community Networks

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## INTRODUCTION

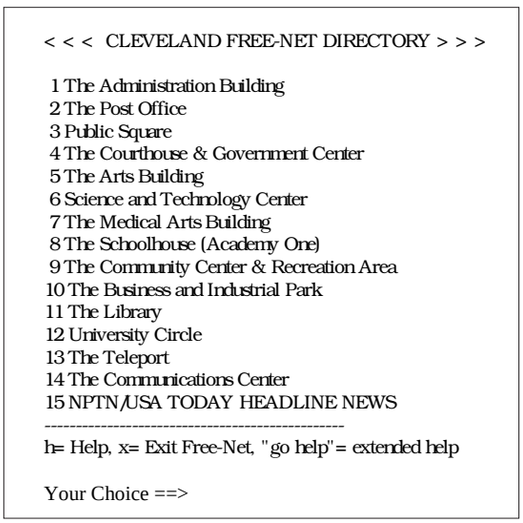
Since the emergence of community networks in the 1980s, several authors have put forth a number of different definitions of the concept. The definitions included below emphasize certain key elements of community networks and comprise a representative sample of views regarding this phenomenon. The Association for Community Networking (AFCN), for instance, defines community networks as "projects that bring local people together to discuss their community's issues and opportunities, learn about Internet technology, and decide upon and create services to address these community needs and opportunities" (AFCN, n.d.). Furthermore, according to the AFCN, there is a "special focus on including those who are traditionally left out of community decision making in general, and technology decision making in particular (e.g., low-income, minorities, senior citizens)." Broadly speaking, community networks are designed, created, and implemented with the purpose of "improving communities—in the social, political and economic realms" (O'Neil, 2002). Indeed, "networks are sometimes defined as communities themselves." A common theme among the various definitions is the belief that networks should create a little self-contained part of cyberspace. Thus, a community network could be construed "as a mini-Internet, only open to members of the community" (Vazquez, 2003). Another important aspect of community networking is the capacity of the Internet and e-mail to aid in community development, in that they "provide access to a new mode of social interaction, one that virtualizes community development processes" (Graham, 1996). Ultimately, community networks and the relationships that develop among the participants make up what has been called an "electronic greenbelt to reinforce and add value to the community" (Cisler, 1993).Schuler (1996) defines community networks as "community-based computer networks … intended to help revitalize, strengthen and expand existing people-based community networks (p. 25). Based on the previous definitions, we postulate our own definition of community networks as organizations that help to strengthen real communities through the creation of virtual communities, not as a substitute for but as a complement to real communities. Typically these community networks are created to address specific local needs involving expansion of Web access to underserved segments of the community but often end up embracing the enhancement of other forms of social, political and economic access as well. Furthermore, as we discuss in some of the sections below, governments can have an important role in sponsoring community networks but, in general, these networks are the offshoots of community activists-volunteers serving in a nonofficial capacity. This allows them to take positions contrary to those of the government(s) serving the jurisdictions that the community networks are in.

## BACKGROUND: BRIEF HISTORY OF COMMUNITY NETWORKING

The following brief history of community networks focuses on a very small number of exemplary cases. A complete chronology and exhaustive list of community networks is beyond the scope of the present work. Furthermore, the focus of this history is limited to community networks within the U.S. The authors recognize the increasing importance of community networks elsewhere, however. Nevertheless, the scope of this article necessarily limits our focus to the U.S. It may, in fact, be the case that community networks outside the U.S. are more vibrant and represent a true growth area for community nets. Community networking originated before the advent of personal computers in the late 1970s. Early community networks had something of a 1960s countercultural quality about them at the beginning with the very first community network system, Community Memory in Berkeley, California, which was started in the early 1970s and featured a preponderance of content regarding local rock bands, particularly the Grateful Dead (Schuler, 1996).

With the growing popularity of personal computers in the early 1980s, community networks started to emerge around the U.S. In 1986, the first free-net (see Figure 1) was created. The Cleveland Free-Net in Cleveland, Ohio, be-

*Figure 1.*




gan as a bulletin board for medical information, "St. Silicon's Hospital and Information Dispensary," and sponsored by Case-Western Reserve University. Users could log-on and leave medical- or health-related questions on the bulletin board, which would be answered within 24 hours by a physician. The project was expanded with funding provided by AT&T and the University Hospitals of Cleveland and the state of Ohio. The information was organized in "town buildings," which could be "visited" by the user:

At the height of its popularity in the early 1990s, the Cleveland Free-Net had over 40,000 registered users (Schuler, 1995).

The Santa Monica Public Electronic Network (PEN) was started in 1989, and in contrast to the two networks mentioned previously, was one of the first to be sponsored by a municipal government. PEN was designed to pursue a number of participatory democratic objectives including:

- Providing easy electronic access to public information
- Providing an alternative means of communication from residents to convey their needs, preferences and intentions to local government
- Facilitating the delivery of local public services to residents
- Serving as a public forum for the expression of opinions on a wide range of issues and concerns of residents to enhance their sense of community
- Providing community members with the means to learn about computer and communications technology

One observer of the experiment notes that its goal from the beginning was to empower the residents of Santa Monica (McKeown, 1991). A key reason for this sense of empowerment was the availability of public computer terminals in libraries and other public places, which allowed even the most disadvantaged community members to participate in the network. Another important aspect of PEN was an attempt to use the nature of online communications to level the playing field of civic engagement; without visible social cues, in theory everyone can participate without the detrimental effects of prejudice. However, this absence of a social context can enable negative behaviors as well. For example, the practice of "flaming"—or exchanging insults online—was alive and well on PEN, even though its creators required participants to use their real names online in order to make it the setting less conducive to abusive behavior.

The Blacksburg Electronic Village (BEV), which still exists (as does the Santa Monica PEN, although it has apparently become part of the Santa Monica city government's Web site), is the result of a unique experiment involving Virginia Tech, Bell Atlantic Southwest and the Town of Blacksburg, Virginia. BEV was created in 1993, to serve as a "virtual community," or as an online location where all the different types of activities (e.g., political activism, social organizing and commercial endeavors) that occur in a physical community can occur via computer network. Unlike the other community networks discussed, the creators of the Blacksburg Electronic Village from the start envisioned that their "wired city" concept would have considerable e-commerce potential. Thus, local businesses lent their support to the installation of a network connection for every home, classroom and business in the city. So that, in addition to the standard provision of information about local events, issues and concerns, the network also provides local businesses with an electronic means to deliver new products and information about services to the residents. According to the BEV Web site, "in 1998, the BEV turned over its residential Ethernet operations to the private sector, again creating new jobs and new business opportunities in the region. By late 1997, there were at least 24 new high tech businesses in the Blacksburg area providing a wide range of Internet services, consulting, hardware, and programming services. … Today, the BEV group works closely with the Town of Blacksburg, local civic groups, businesses, and individual citizens to ensure that these new communications tools are used to support the every day human activities of Blacksburg."

## Community Networks Today

By the mid-1990s, it was already clear to several observers that the community networking movement was in trouble (Beamish, 1996; Schuler, 1996). In little over a decade, civic networks grew from a mere handful to several hundred, with an estimated 400,000 registered users (Schuler, 1996). At the peak of their popularity, however, community networks fell victim to their "vague, simplistic and unrealistically utopian" goals (Beamish, 1996) or their "utilitarianism," lack of community support and understanding, as well as excessive focus on the technology undermined their success (Schuler, 1996). Successful community networks meanwhile were integrated into the life of their community, provided local content and focused on local needs, made linkages with local institutions including government and schools, and installed processed that helped guarantee their long-term sustainability (Rosenbaum & Gregson, 1998).

A typology to classify community networks has been developed (Beamish, 1995). Free-nets are "community-based," rely heavily on volunteers, and provide a rich source of local information and discussion. Earlier free-nets offered free Internet service to community members in addition to an Internet portal, which could also be used to access links elsewhere in the world (e.g., the Cleveland Free-Net). Today, free-nets are still community-based and volunteer-managed but they are less likely to provide free Internet access to community members. Municipal government-sponsored community networks are similar to free-nets except they are operated by local governments instead of volunteers and emphasize access to government records and some services. Nonprofits for nonprofits are community networks that are created and managed by nonprofits to assist other nonprofits with access to the Internet and to form virtual communities based on a commonality of interest. Finally, the wired city is a futuristic model of a community in which every household, government agency, school and a high-speed computer network interconnects business. Needless to say, this is the most rare type of community network since it requires considerable expense to establish.

## FUTURE TRENDS: COMMUNITY NETWORKS AND DEMOCRACY

An early proponent of computer networks as a vehicle to spur democratic change begins an essay with this provocative passage: "The Internet will save democracy. Or so the early 1990s technohype led many to believe. With each new communication medium comes a wide-eyed view about its potential. I'd like to suggest that just as television saved democracy, so will the Internet" (Clift, 1998). As this extract shows, the wildly optimistic belief in the impending advent of electronic democracy is less viable today than it was even a decade ago. As far back as 1985, an influential observer predicted, "very large numbers of people empowered by knowledge … assert the right or feel the obligation to make policy" (Cleveland, 1985). In the 2004 Democratic Party presidential primaries, the Howard Dean campaign made national headlines with its adroit use of the World Wide Web to attract millions of contributors and activists. By focusing so much attention, however, on the Web's capacity to fuel political fundraising, the mainstream media missed a more important point: The WWW represents a new medium for engaging citizens in civic matters on a vaster scale than any other in history. The Internet, with its many-to-many, decentralized, and non-hierarchical flow of information, is in marked contrast to mass broadcasting with its one-to-many flow of information. Moreover, radio and television broadcasting requires large capital outlays, which inevitably leads to centralization of information and power. Mass broadcasting still shapes much of the political discourse in current society, presenting us with a top-down communication channel that equates political power with control of television and radio networks. For example, one of the first things the Bush administration did after occupying Iraq was to establish new American-run radio and television stations as a means of exerting control over the messages received by the Iraqi people.

E-democracy or democracy via the World Wide Web has two key components: (1) e-government, or the use of the Internet by governments to provide information and to provide delivery of public services or goods and (2) Net-Actvism, or the use of the Internet to encourage civic engagement and participation in local governance. E-government is an idea that emerged during the 1990s, as many governments started to adopt many e-business and e-commerce techniques from the private sector. Facilitating citizen access to and participation in government has always been a large part of technology's appeal to activists (Northrup, Kramer, Dunkle, & King, 1990). The ability of citizens to initiate direct contact with government is dramatically enhanced by the Internet. However, this aspect of communication and information technologies tends to be overlooked by governments, which far more frequently view the Internet as a means to improve the efficiency of government operations, rather than as a means to improve government-citizen relations, which is actually of more tangible benefit to citizens (Northrup et al., 1990).

Using community networks to stimulate public discussion of issues and to encourage civic engagement lags far behind a service-based approach to the Web. It

is far more typical for governments to take a "services first, democracy later approach" (Clift, 1998). Although governments generally do a good job of disseminating public information by the Internet, the U.S. Bureau of the Census is an excellent example, one gets the impression that the chief attraction of information and communication technologies for governments is the effect they will have on service delivery. Political and social activists believe that governments are capable of doing much more in the area of strengthening our political institutions via the Web. For instance, municipal Web pages are underutilized as a means to promote civic engagement (Hale, Musso, & Weare, 1999).

## CONCLUSION

Community networks are designed to promote the political empowerment and economic revitalization of local communities, particularly through the enhancement of civic participation. Typically, this means that community networks emphasize improved access to the Web and information technology more generally for marginalized members of communities (e.g., social and economic minorities). The peak of community networking in the U.S. occurred from the mid-1980s to the early 1990s; during that time hundreds of new community networks were formed that served hundreds of thousands of people. Since the mid-1990s, however, the number of community networks has declined for a number of reasons including over-ambitious goals and lack of support. Local governments can help revive community networks as part of their commitment to increasing their presence on the Web. However, government seems less interested in encouraging civic engagement than in achieving efficiencies by streamlining public service delivery.

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## KEY TERMS

**Association for Community Networking (AFCN):** An international organization providing resources, shared learning, and experienced guidance to help communities and organizations use information and communications technologies effectively.

**Civic Engagement:** Involving citizens in community building either through NetActivism or non-Web based means.

**Community Networks:** Computer networks (i.e., mini-internets) designed for the purpose of bringing people together to discuss and address a variety of local issues.

**Electronic Democracy (E-Democracy):** The concept that democratic goals can be furthered and democratic institutions strengthened via the World Wide Web and more generally computer technology.

**Electronic Government (E-Government):** Government delivering public services via the World Wide Web, less frequently government use of the Web to facilitate political participation

**Free-Net:** A community network that provided free Internet access to all residents; depends heavily on local volunteers for its administration.

**Net-Activism:** Facilitation of civic and political participation through the Web.

**Virtual Community:** Communities that exist primarily or entirely on a computer network (e.g., computer chat rooms with regular denizens).

# Community-Based Information Networking in Developing Countries

C

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## INTRODUCTION

The information era refers to a period in this globalized world when economies, social dimensions, and demography are largely dominated and driven by information, in contrast to the previously industrial development driven society. *Information society*, *information network*, and *digital divide* are terms inducted in very recent days. The key element in this periphery, is the information, and it is the easy and free flow of information to the demand routes. Because of the information-based nature of the modern economy, the globalization of the telecommunication industry, and the interdependent global environment, the value of the global network grows and more users are interlinked.

The information society is driven by information, similar to the industrial society. This society is produced by a reliance on information as the most significant factor in the terms of production. Hence, it relies on the information economy to produce products, services, employment, wealth, and lifestyle on which the community depends. Ultimately the whole community of a country can be benefited by optimum utilization of information to be flown into each territory of the society. Given the right incubation, a community based information network molded by information can accelerate the pace of development.

Rapid advancements and convergence of information and communications technologies (ICTs) have a deep and far-ranging impact on economic, social, and political life. The increase in the speed of and variations in communication flows is catalyzing an unprecedented growth in the exchange of ideas, goods, and services. Government, organizations and businesses that ignore this development and lag behind in adaptation risk themselves becoming uncompetitive, marginalized and out of the game (ABDI, 2002).

Efforts have been given to accommodate propositions on fabricating nationwide information networks through utilization of the existing information backbones especially in developing countries, and a centrally driven content repository may eventually be established.

## BACKGROUND

Rapid human development programmes depend on the formation of a robust civil society. Community members develop their capacity by integrating information and knowledge into the various development activities. Such capacity empowers people to solve intelligently the problems that exist in their community and eventually transform them into valuable assets of the society.

E-society or networked society encompasses the role of the Internet and other ICT services in everyday life, particularly related to interactions in the household, personal needs, and entertainment. It also encompasses the needs of individuals and the wider community in work, social relationships, leisure, and activities in other arenas that assist the society to be online. This interest is not only limited to the passive consumption of ICTs in these settings, but also takes into account the design, redesign, production, and governance of the multiplicity of old and emerging communication innovations that are reshaping the media habits and practices across all sectors of society.

When community information centres are supposed to act as a crucial tool for human development, community users are urged to cultivate and adopt a critical attitude towards the usage of information. Justifying the source of information they may evaluate, analyze, and adapt information and knowledge for their own perspective, economic, political, and social conditions. This process of justification of the content and source of content forms the basis for changing and transforming the community.

The UN General Assembly stipulated through a resolution, that "to marshal the global consensus and commitment required to promote the urgently needed access of all countries to information, knowledge, and communication technologies for development so as to reap the full benefits of the information and communication technologies revolution, and to address the whole range of relevant issues related to the information society, through the development of a common vision and understanding of the information society and the adoption of a declaration and plan of action for implementation by Governments, international institutions and all sectors of civil society" (UN General Assembly Resolution, 2001).

It is believed that rural community people everywhere are born intelligent enough to sustain in diversified situations (Edgemont Resource Team Report, 2004; OTA Report, 1996; Saga, 2005). Their ability and capacity in tackling difficult circumstances and finding solutions to the struggle of everyday life have been recognized. It is also believed that the intelligence of rural people is often underestimated and emaciated. Limited access to information and knowledge prevents the full use and potential growth of intelligence in rural communities. The structures (systems and services) supporting the information flow to rural areas and deprived urban areas are not always in healthy condition. Those responsible for putting resources toward such infrastructures have not considered it important to invest in and to set up information and knowledge networks. The time has come to involve the rural community people in identifying their own information needs for their community development.

While expanded infrastructure may ensure physical access to the global communications network, there are other non-physical barriers to access that also contribute to the digital divide. The right to access and use information is one that may be blocked only too easily, for example, by pricing, patents, or censorship policies. On the other hand, high-tech equipment may be necessary but it is useless unless people have the literacy, education, computer-training, and capacity-building required first to operate the equipment, and then make full use of the knowledge or information they access. Furthermore, developing countries' high levels of foreign indebtedness inhibits their capacity to contribute to the generation of knowledge, for example, through national investment in research (Accuosto & Johnson, 2004).

To overcome these issues, a common comprehensive consensus among the developing countries needs to be set up at the country level, integrating policies, implementation plans, usage patterns, and behavioral changes for the marginal communities by adopting the benefits of information and content for their own uplift.

Both the global communications network and the Internet exhibit network externalities—their value to any single user increases as they are expanded and as more users join. The higher the number of telephone users, the greater the number of interactions that become possible. On the Internet, each new user may be a potential supplier or consumer of goods and services, and can expand the global market (UNDP, 2002). Theoretically any number of users can simultaneously interact in cyberspace. By ratcheting up the necessary physical infrastructure- adding servers, increasing telephone lines, building additional satellite capacity—new users can simply piggyback on the existing system: it is almost infinitely expandable (Spar, 1999).

In July 2000, the G8 countries adopted the Charter on Global Information Society at their summit meeting in Okinawa, Japan. This reflected the G8's recognition that information technology is one of the most potent forces shaping the 21st century. The charter discussed the creation of a global information society (ADB, 2003).

To become critical users of information and knowledge, a community would like to analyze both the knowledge that comes from outside the community, and its own inherited knowledge. The community would also like to study the cultural and social aspects of gender, race, tribe, class, and poverty. However, these studies need to be adjusted and formulated so that transforming information into knowledge can create real value-added services at the grass root level.

## STRATEGIES TO ESTABLISH INFORMATION NETWORKING

A rise in per capita income cannot be the sign of digital literacy, but a well established vision at the central level with a dedicated workforce and commitment at the implementation stages would lead to a sustainable society towards achievement of development. Under no circumstances should governments try to over-regulate the growing ICT sectors, at least for the next ten or fifteen years.

The main challenges can be pinpointed as:

- integration and interoperability of technologies
- tackling the speed of technology obsolescence
- shortage of knowledge based manpower
- data and information security and privacy
- mobilization of funds

To face the challenges, the author suggests that a three-tiered effort may be initiated at the national level. It is scheme, evolution, and empowerment.

### Scheme

A concrete strategic plan needs to be initiated at the national level incorporating possibilities of dynamic adjustments in each stage of development and action, resulting in optimum resource utilization and maximum benefit out of it. The new strategy requires an indigenous method, an open coordination concept, and a realistic measure by:

1. Identifying and defining common objectives; and
2. Simulating the quality and relevance of capacity enhancement programmes, to

- Build human resources capacity development to improve knowledge and skills, promote ICT-literacy and lifelong learning of citizens through e-learning and awareness programs, and prevent brain drain;
- Develop ICT applications and information content to support uplift of sustainable development related activities, promoting poverty reduction and better governance;
- Integrate ICT applications to improve the flow and use of information and knowledge for effective usage at the marginal levels;
- Promote strategic alliances and partnerships with existing ICT initiatives at national and local levels, and establish principles of effective partnership of mutual understandings, develop new job markets, and create stable jobs; and
- Establish a center of excellence (promoting lifelong learning, mass information dissemination, improved communication, and knowledge networking) at potential level with dynamic interaction and make it self-sustainable.

## Evolution

Then, an evolution phase may start with:

- **Improved Infrastructure:** Developing countries should emphasize physical infrastructure, human capital, and government policies to enhance and amplify the effects of investments in ICT;
- **Increased Investment:** Developing countries have not invested enough in ICT for productivity increases. They should invest more in ICT by attracting private sector investments, participate in the new economy and seek to achieve e-development;
- **Extended Telecommunications Infrastructure:** In developing countries, telephone lines per 100 people average 2.6, compared with 66.4 in the United States. Computer ownership is 4.4 per thousand people in developing countries compared to 511 per thousand in the United States. These gaps should be lessened;
- **Uplift in Basic Education:** Literacy is fundamental for a society to have the capacity for mass participation in the digital technology;
- **Increased Government Patronization:** National governments have a responsibility to promote the use of ICT and financing for ICT "mainstreaming" to address development goals. Government should reduce taxes, tariffs, remove other barriers on computer imports, encourage competition in telecommunications, itself become a sophisticated user of ICT, and promote mass usage of Internet; and
- **Easy Access to Internet:** Governments must enact legislation to ensure easier access, and wider use of Internet among a larger portion of the general communities.

## Empowerment

Finally, empowerment should focus on:

- **Empowerment of Society:** To capture the ability of ICT to overcome conventional barriers faced by marginalized communities, and to be demand driven;
- **Empowerment of Local Government:** Creation of a national information infrastructure and extension of the network to the local government level for the utilization in better governance and transparency;
- **Empowerment of Business:** Focusing e-commerce at the marginal community level, SMEs need to be empowered with better logistic support, including necessary laws; and
- **Empowerment of Knowledge Network:** Utilizing the information backbone as the catalytic agent, actors, and agencies involved in sustainable development are needed to be networked to form a common platform of knowledge interchange, promoting local content, community participation, and ownership.

In order to optimize scarce financial resources, appropriate cost-effective technological options should be utilized, while avoiding duplication of infrastructure. Additionally, synergies between different sectors and networks can be exploited to this end, with particular attention to the energy and transport sectors, given their close links with the telecommunications sector (Accuosto & Johnson, 2004).

Information kiosks would be a key part of the information infrastructure in rural areas. Despite skeptics who want hard statistics on improvements in poverty levels and other measures of ICT impact, this initiative reflects the confidence that has been observed, and the positive changes that can come from timely and relevant information and communication services (Colle, 2004).

Implementation of a successful community information centre in a locality with potential contribution to the society depends on multi-dimensional aspects and much more complicated issues which can be learned only during the implementation and operation period. One community centre is may be very much more diversified

than another community centre, though they may be located in the same district town. One may focus on local content, while the other may concentrate on the most yielded agriculture product to serve the purpose of the community.

The driving force in setting up a community information centre is the realization that the community has limited access to the information that allows them to make decisions, and to take action to direct and control their own future. However, what is not realized, quite often, is that starting an information resource centre is easier than ensuring that the resource centre survives. To survive, it must become a sustainable entity and an integral force in the struggle for development of the community.

## INITIATIVES ON INFORMATION NETWORKING

A few success initiatives have been described below that are acting as catalysts in several countries towards the establishment of information networking.

A South African-based company has made an investment in a low-cost, four-in-one personal computer that could lower the cost of offering information communication technology in learning institutions. Each system has a built-in telephone handset, 14-inch monitor, built-in speaker, keyboard and touchpad, 56K modem, three Universal Serial Bus (USB) ports, Intel processor, and Ethernet facility (Ramani & Adeyemi, 2004).

Dr. Reddy of Carnegie Mellon University is working on his project, called the PCtvt, a USD250 wireless networked personal computer intended for the four billion people around the world who live on less than USD2000 a year (Markoff, 2004). The MIT Media Lan has launched a new research initiative to develop a $100 laptop, and this received high media coverage in the World Economic Forum at Davos, Switzerland in January 2005, as well as in WSIS Tunisia in December 2005 (MIT Media Lab, 2005).

President Wade has presented the concept of digital economy in his speech in June 2002, at a UN occasion and it can be treated as a conceptual case. The Senegalise president had proposed the establishment of a "World Fund for Information and Communication Technologies" to "help Africa reduce the digital divide that separates it from the rest of the world." He also highlighted the importance that was being given to the development of the new ICT in the framework of the New Partnership for African Development (NEPAD) as an engine for development (http://www.afrol.com/News2002/afr018_nepad_wade.htm). President Wade considers the new technologies one of NEPAD's eight priority sectors (http://www.idrc.ca/en/ev-51491-201-1-DO_TOPIC.html).

In a communiqué issued on the occasion of the Ministerial Round Table on "Towards Knowledge Societies" UNESCO supports the Senegalese concept, and states "We urge the international community to help the developing countries to build their capacity so that they can achieve self-reliance as soon as possible. To achieve this objective, we need to pay particular attention to the identification of possible mechanisms for the funding of this effort, including the setting up of a digital solidarity fund (DSF) to augment national resources (UNESCO, 2003).

The World Bank has been running an Information for Development Program (infoDev) since September 1995, the original aim of which was "to promote innovative projects on the use of ICTs for economic and social development, with a special emphasis on the needs of the poor in developing countries" (infoDev, 2004). However, the 2004-2005 strategy aims to "strengthen the linkages between pilot projects, evidence, analysis, and action in harnessing ICTs for development" (infoDev, 2004).

The mission 2007 is designed as an offering of the S&T and academic community, civil society organizations, private and public sector industry, financial institutions, international partners, and the mass media to the nation on the occasion of the 60$^{th}$ anniversary of India's Independence on August 15, 2007. With this mission, an independent rural India with broadband connectivity for every village at low and affordable costs, and with integrated and diversified technological applications that are relevant to their day-to-day lives, bringing them prosperity and happiness is envisioned (MSSR Foundation, 2004).

The e-Sri Lanka initiative utilizes ICT to develop the economy of Sri Lanka, reduce poverty, and improve the quality of life of the common people through a government and private sector partnership approach (e-Sri Lanka, 2005). Similarly, the Sarvodaya Telecenter program in Sri Lanka provides special emphasis to the Village Information Centers (VICs) to reach out to the rural poor communities, in order to establish sustainable low cost ICT models and empower rural masses (ICTA, 2005; Kapadia, 2005).

To uplift socio-economic development, the government should undertake broad-based action plans. Inclusion of the following article in the ICT Policy of Bangladesh, is a positive step in this aspect:

*3.2.11 Socio-economic development can be accelerated if more people can have access to information. Teledensity is important in this respect and it will be increased to broaden the coverage, which will improve the socio-economic condition of the people through ICT-related activities in line with experience of developed countries.* (ICT Policy, 2002)

## FUTURE TRENDS

There is a great hope that e-development within the new economy will provide a shortcut to prosperity by allowing developing countries to bypass certain traditional phases of development in the conventional, long-lasting and belt tightening process of structural change from agrarian to industrial and, ultimately, to knowledge-based service economies (Clarke, 2003).

Effective networking among development partners will create a level-playing platform of communication and knowledge sharing to promote capacity building and society enhancement activities, especially at the grass roots. Further extended research by focusing specific objectives and implementing methodologies of the existing success cases could be the current demand of the community.

All these imply efforts in strengthening cooperation on education, training, and human resource development policies. Detailed programme and action plans on the future objectives of education and training systems need to be prepared to face the challenges. The policies need to be implemented using the "open coordination concept" among all the partner organizations.

## CONCLUSION

A major barrier to the development of e-governance in developing countries is the lack of information infrastructure. In a few countries in Asia, the phone and Internet penetration may be higher, but still the ratio is low when compared to developed countries. Furthermore, disregarding the limited commercial usage in these regions, affordable ICT usage at the marginal community level is yet to be achieved.

ICT regulation is complicated by the fact that electronic transactions usually involve several third parties and cross numerous territorial jurisdictions. The newness of the subject and its lack of proceedings mean that the interpretation of regulation is inevitably open, and subject to debate (ADBI, 2002).

Public policy in developing countries is important in setting development strategies. Globalization has limited the influence of governments over economic activities within their own countries. But governments still have an important role in defining and establishment an enabling environment for development (Clarke, 2003). As the business of modern government gets more complex and knowledge-intensive, the potential for cost and service benefits associated with streamlining Knowledge Management becomes intense. A more knowledge-intensive approach to governance will redefine how the public sector relates internality among its own agencies and its own employees (Smith, 2004).

It is evident from the discussion so far that ICTs in poor communities can be much more than a means of delivering useful pieces of information such as accessing market prices or health information via the Internet. However, this kind of information access is important, and has been developing in the ictPR (ICT for Poverty Reduction) initiatives. More than simply accessing information, many of the initiatives have been creating, circulating and/or archiving indigenous knowledge (UNESCO, 2004). In the case of ensuring universal access to ICT infrastructure it is only too clear that expansion of communications networks to isolated rural areas or the most marginalized and poorest communities holds little prospect of profitable returns for investors (Accuosto & Johnson, 2004).

Spare bandwidth on low-earth-orbiting satellite may be allocated at a subsidized rate to developing countries, especially to be utilized for community telecenter purposes. Accumulating a majority of the above mentioned networks may form nationwide information backbones with little initiative and effort, providing opportunities to form advanced information and research networks in each country.

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## KEY TERMS

**Community Information Centre:** Place in a community where formal organized services and informal neighborhood and support services are available to assist with immediate and basic needs of the community via information based activities.

**Community Telecenter:** It provides the community members the ability to utilize ICTs in a publicly shared manner. Telecenters sometimes provide the only connectivity available to many community members, and their services may be offered with or without a fee. Community refers to a set of people with some shared element, and particularly comprises a group of people living in the same area.

**Communication Network:** A form of telecommunications network that connects entities to disseminate messages from one part of the network to another over multiple links.

**Developing Country:** These are countries that have not achieved a significant degree of industrialization relative to their populations, and have low standard of living.

**E-Government:** A form of government which uses information and communication technologies (ICTs) for improving the activities of public sector organizations.

**E-Society:** A society that deal particularly with the relationship between public agencies and other institutions—other public agencies, private sector companies, non-profit and community organizations through electronic means.

**ICT:** ICT can be termed as the set of activities that facilitate, by electronic means, the processing, transmission, and display of information. It is at the convergence of a tripod of three specialized domains, namely information technology, data and information, and socioeconomic issues.

**Information Society:** In this type of society the information accounts for a significant part of the added value of most goods and services, and information intensive actions become distinctive of the households and the people.

**Networked Society:** A society in which communities participate more directly in an interconnected mode, information devices are culturally accepted and widely incorporated into the daily life.

**Networking:** Networking concerns connecting people of similar interests for the purpose of uncovering opportunities, identifying local demands, and learning of best practices. Alternately, networking incorporates two or more devices (or people) communicating to each other and sharing resources.

# A Conceptual Framework for Considering the Value of E–Government

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## INTRODUCTION

E-government implementation requires public administrators to respond to stakeholder value. While there are many concepts of value in the field of public administration, an integrated framework that public administrators can use to consider the value of e-government to stakeholders is lacking.

The new public management suggests that public administrators can best produce value by becoming entrepreneurial and more responsive to stakeholder needs (Barzelay, 1998; Denhardt & Denhardt, 2000; Frederickson, 1980; Goodsell, 1993; Kettl, 1993; Kettl & Milward, 1996; Moe, 1994; Osborne & Gaebler, 1992; Osborne & Plastrik, 1997; Stillman, 1995). Certainly e-government applications hold the promise of strengthening the relationship between public administrators and stakeholders in ways that better respond to needs and thus provide more value to stakeholders and to society in general. Current e-government classification methodologies tend to focus more on the stages of development of e-government applications (Layne & Lee, 2001; Moon, 2002; UN & ASPA, 2001; West, 2004) than on the different kinds of value that can result from meeting stakeholder needs.

There is an emerging emphasis on stakeholder needs and value in the e-government literature rather than on classification methodologies that focus on stages of development (Grant & Chau, 2005; Reffat, 2005; Savoie, 2004; Schware & Deane, 2003; Tan, Pan, & Lim, 2005; Welch, Hinnant, & Moon, 2005). This article responds to these ideas by focusing on stakeholder value to develop a conceptual framework that public administrators can apply to e-government. Such a framework will provide insight into: whether or not an e-government application is worthwhile; and if worthwhile, what political management strategies might be employed to support it. The framework will also facilitate the comparison of e-government alternatives.

## BACKGROUND

This section looks at the new public management debate and how it has focused attention on both market and politically derived stakeholder value. Current methodologies used to classify e-government are then reviewed with the conclusion that they focus more on development than on value. At the end of this section is a discussion of the emerging emphasis in the e-government literature on stakeholder value and its relationship to a new framework of e-government value.

## THE NEW PUBLIC MANAGEMENT DEBATE

The new public management represents a change in our views of governance. From the point of view of its proponents it is a shift away from a reliance on bureaucratic rules and rule making, impersonal systems of control, and managerial professionalism. The new public management emphasizes the implementation of business practices that make government institutions more sensitive to stakeholder needs (Osborne & Gaebler, 1992). As a consequence, government must reinvent itself in ways that are more entrepreneurial, responsive, and consumer oriented (Frederickson, 1980; Goodsell, 1993; Kettl, 1993; Kettl & Milward, 1996; Moe, 1994; Osborne & Gaebler, 1992; Osborne & Plastrik, 1997; Stillman, 1995). Perhaps the approach is best summed up by Denhardt et al. (2000) as public administrators who serve rather than steer society: "the primary role of the public servant is to help citizens articulate and meet their shared interests rather than to attempt to control or steer society." The assumption that underlies this reinvention is that the approach will make government more valuable to society.

Far from being accepted dogma in the field of Public Administration the new public management has caused some lively debate. For example, regarding the implementation of more business practices in government, Terry Moe (1995) is concerned about profound differences between the public and private sectors. These differences are rooted in the contrasting nature of authority upon which the two are based. The authority of the private firm emerges from voluntary, self-interested exchanges, while in public firms authority is not voluntary and often contrary to self-interest.

Oliver Williamson (1995) who has based his work on the idea that institutional structures in the market are the result of attempts to economize on transaction costs none-the-less finds Moe's arguments "compelling." Williamson agrees that Moe's idea that farsighted politicians realize that they will not always be in office and therefore build inefficiencies into public bureaucracies to frustrate the efforts of successors to reshape an agency creates a fundamental difference in public and private bureaucracies.

One of the more lively debates regarding the appropriateness of the new public management took place between Terry (1998) and Frant (1999). Terry is very much concerned about what he believes to be the undemocratic nature of the new public management and that the:

*... public entrepreneur's penchant for rule breaking and for manipulating public authority for private gain has been, and continues to be, a threat to democratic governance. The danger is intensified by the emergence of public entrepreneurs of the neo-managerialist persuasion.* (1998, p. 197)

Frant argues that Terry misunderstands the new public management:

*Neo-managerialism as presented by Terry, then, is a strikingly bizarre ideology, for its two main pillars, the managerialist pillar and the economics pillar, stand in direct contradiction to each other. The former says managers must be freed from constraints, the latter says that they require extensive policing and cannot be trusted.* (1999, p. 268)

Whether or not one agrees with the new public management, it has served the purpose of forcing a reconsideration of the role of public administration and highlighted the relationship between public administrators and stakeholders. In the debate some have cast the public administrator as an entrepreneur and consequently introduced market derived concepts of value (Frant, 1999; Osborne & Gaebler, 1992; Williamson, 1995). It has also invigorated those who see the public administrator as an integral part of the political process and consequently introduced politically derived concepts of value (Denhardt et al., 2000; Moe, 1995; Terry, 1998). In some instances the debate shows sharp contrasts of views as in the case with Terry (1998) and Frant (1999). But it also shows some attempts at accommodation as suggested by Oliver Williamson's (1995) comments on Moe's (1995) work. The real value here has been the raising of issues surrounding two very important concepts of values as they relate to public administration, those that are market derived and those that are politically derived.

These two concepts of value should be applied to e-government initiatives, but this does not seem to be the case. Rather, current classification methodologies are more focused on the staged development from simple to more sophisticated e-government applications.

## E-GOVERNMENT CLASSIFICATION METHODOLOGIES

A great deal has been done to understand e-government from a developmental perspective. The purpose of the classification methodologies has been to provide ways to determine how advanced e-government is in various jurisdictions.

The current state of classification methodologies for e-government applications are typified by West's (2004) approach. West suggests four stages of e-government transformation: (1) the billboard stage; (2) the partial-service-delivery stage; (3) the portal stage, with fully executable and integrated service delivery; and (4) interactive democracy with public out-reach and accountability enhancing features.

Moon (2002) suggests five stages of development "which reflect the degree of technical sophistication and interaction with users: (1) simple information dissemination (one-way communication); (2) two-way communication (request and response); (3) service and financial transactions; (4) integration (horizontal and vertical integration); and (5) political participation."

A joint study done by the United Nations and the American Society for Public Administration also employed five stages of e-government development to UN member states (UN & ASPA 2001, p. 2):

- **Emerging:** An official government online presence is established.
- **Enhanced:** Government sites increase; information becomes more dynamic.
- **Interactive:** Users can download forms, e-mail officials and interact through the Web.
- **Transactional:** Users can actually pay for services and other transactions online.
- **Seamless:** Full integration across administrative boundaries.

Finally, Layne and Lee (2001) look at the stages of e-government development from the perspective of two variables: technological and organizational complexity; and integration. This yields four stages: catalogue, transaction, vertical integration, and horizontal integration each of which have increasing amounts of complexity and integration.

While these approaches have contributed to the understanding of e-government they are based on an assumption that reaching the final stage is an important goal of e-government initiatives. While there is some disagreement as to what the final stage is, the vision seems to be an interface that is highly integrated in ways that maximize user convenience. Ho (2002) describes the vision as a one-stop service center and believes that:

*The emergence of the World Wide Web further facilitates the growth of a one-stop service center model because a government Web site can itself serve as a convenient and cost-effective platform for centralized service provision.*

While more integrated or more developed e-government applications probably indicate more sophistication this does not necessarily translate into more value. Rather than, or in addition to focusing on stages of development, e-government initiatives might benefit from paying direct attention to the concepts of value highlighted by the new public management debate. Evaluating e-government initiatives in terms of the market derived and politically derived value provided has at least two advantages. First, it is consistent with the concerns currently being discussed in the field of public administration (i.e., the new public management debate). Secondly, it is consistent with the concerns of public managers who must justify new e-government initiatives in terms of the value they add.

## EMPHASIS ON MARKET DERIVED AND POLITICALLY DERIVED STAKEHOLDER VALUE

There is concern for stakeholders in the e-government literature (Schware et al., 2003; Tan et al., 2005) and the effects they have on governance and policymaking (Savoie, 2004). E-government initiatives cannot succeed without taking into account, the three critical aspects of stakeholder management: (1) identification of stakeholders; (2) recognition of differing interests among stakeholders; and (3) how an organization caters to and furthers these interests. (Tan et al., 2005) Determining stakeholder values and building those preferences into e-government initiatives is not the same as moving through various stages of e-government development.

In a study of the deployment of e-government in developing countries Schware et al. (2003) used five categories of value to describe e-government examples in India, Estonia, the Philippines, Mexico, and Chile:

- **Direct Citizen Value:** Citizens gain value from increased access and reduced delays, improved service delivery, and less interaction with intermediaries.
- **Social Value:** Improved trust in government. Increased sharing of information. Monitoring of regulatory compliance, greater visibility.
- **Government Operational Value:** Improvement in current performance and in preparation for future requirements: on-time, completion rate, redundancy, network congestion flexibility.
- **Strategic/Political Value:** Organization perceived as moving toward fulfilling its mission: improved public image, legislative guidelines met.
- **Government Financial Value:** Benefits that impact organizational and other federal government budgets: reduced cost and steps per transaction, decreased cost of materials, reduced cost of error correction.

Welch et al.'s (2005) study showed general satisfaction among U.S. citizens with the implementation of e-government. The study also showed a relationship between use of e-government and citizen trust in government. However:

*Individuals with government Web site experience find that government is not fulfilling their expectations about interactivity and in some cases service provision. Results indicate not only that there are direct negative effects on e-government and Web site satisfaction but that there may also be indirect negative effects on citizen trust in government.* (Welch et al., 2005)

This research demonstrates some empirical evidence for the existence and effect of stakeholder responses to e-government based on their values.

In designing a generic framework for e-government Grant et al. (2005) developed what they termed strategic focus areas (SFAs): service delivery; citizen empowerment; market enhancement and development; and exposure and outreach. Each of the SFAs are further defined in terms of key functional applications such as e-participation and e-democracy under citizen empowerment. This represents a more sophisticated view of e-government that goes beyond the classification methodologies that focus on staged development.

This recent research is more consistent with the new public management debate which considers market and politically derived value. For example, Grant et al's (2005) service delivery SFA provides market derived value since it reduces the costs of government imposed ex-

*Figure 1. Categories of e-government value*

| E-Government Value Category | Brief Description of Value |
|---|---|
| Passive-Market Enhancing | Designed to reduce the cost of government imposed exchanges on citizens and perhaps make it more efficient to identify and charge costs to beneficiaries of government programs |
| Active-Market Enhancing | Designed to adjust aggregate demand in the market of a jurisdiction by taking new initiatives made possible by e-government |
| Passive-Politically Derived | Designed to increase efficiencies in existing government operations and are not directly concerned with broader policy matters |
| Active-Politically Derived | Designed to actively search out and test value definitions and are directly concerned with broader policy matters in ways made possible by e-government |

changes on citizens. The citizen empowerment SFA provides politically derived value as it improves constituent relationships management and also searches out and tests value definitions among citizens. (Grant et al., 2005)

Not only does the recent literature focus on value to stakeholders but it also suggests sub-categories for both market and politically derived value. Some of the categories of stakeholder value indicate that e-government initiatives can accomplish pre-existing objectives more efficiently. For example, direct citizen value (Schware et al., 2003), and service delivery (Grant et al., 2005) are designed to reduce the cost of government exchanges to citizens. The presumption is that these exchanges are the same ones that took place prior to the implementation of e-government and therefore can be said to be a more efficient way of doing the same thing. The term passive is chosen to describe this since no fundamental change in the nature of the exchange due to the introduction of e-government takes place. Since direct citizen value (Schware et al., 2003), and service delivery (Grant et al., 2005) for the most part provide market derived value to stakeholders (i.e., economic benefit) by accomplishing pre-existing exchanges at less cost the value is categorized as passive-market enhancing.

The term active is used where the nature of the exchange is fundamentally changed by the introduction of e-government. The active designation implies new initiatives and change that could not take place without e-government. For this reason market enhancement and development (Grant et al., 2005) is categorized as active-market enhancing since it envisions new collaborations and partnerships as well as global business development that become possible only with the introduction of e-government. passive-politically derived value includes Government financial value (Schware et al., 2003) and in part citizen empowerment (Grant et al., 2005) in so far as it improves constituent relationships management (a political process which has not fundamentally changed but become more efficient with the introduction of e-government). Finally, active-politically derived value includes social value (Schware et al., 2003) and citizen empowerment (Grant et al., 2005) in so far as they search out and test value definitions among citizens. Savoie (2004) indicates that the organizational boundaries within government as they affect policy making fundamentally change with the arrival of e-government initiatives related to social value (Schware et al., 2003) and the value testing and search aspects of citizen empowerment (Grant, 2005). As with market derived value the determination as to whether politically derived value is categorized as passive or active is related to the extent to which there is a fundamental change in the nature of the transaction due to the introduction of e-government.

## FUTURE TRENDS

Future e-government classification methodologies will be oriented more toward stakeholder value with less emphasis on the staged development classifications used in the past. In this section a conceptual framework for considering the value of e-government is presented. First the categories of value, both market and politically derived, are reviewed. Secondly, there is a discussion of how public administrators can use the categories to manage stakeholder support in ways that create an enabling environment for e-government.

## CATEGORIES OF E-GOVERNMENT VALUE

The preceding discussion on stakeholder value in the field of public administration is by no means exhaustive. Many important ideas regarding public value have been

ignored. For example, there is no consideration of public choice theory or some of the fascinating work done in the judicial system (Komesar, 1994). However, the beginnings of a framework with four value categories have been developed and briefly discussed in a way that will help practitioners to better understand the value of e-government alternatives. The categories are summarized in Figure 1 (Downey, 2004).

While the four value categories are helpful to public administrators they require a more refined understanding of their utility in order to form a useful framework of e-government value. The categories suggest management strategies for the implementation of e-government which are discussed in the next section.

## CATEGORIES OF E-GOVERNMENT VALUE AND POLITICAL MANAGEMENT

Having defined the four categories of e-government value it is now appropriate to briefly discuss how they might effect the creation of an enabling environment for e-government implementation. The four categories of value have five characteristics, which are general rules that describe how they can be used by public administrators. The four categories together with their five characteristics form the conceptual framework for considering the value of e-government.

Just as Tan et al. (2005) advocates for understanding stakeholders and their values, Moore advocates that public managers accomplish this by engaging in the political process even though, "the political environment surrounding their operations is a dangerous place." (1995, p. 132) This engagement is loosely defined as political management. Despite the dangers, engagement in the political process helps to define and produce public value, making political management essential to the creation of an enabling environment for the public management action required to implement e-government. The degree and form of political management required to create an enabling environment for e-government applications is largely dependent on the categories of value described in Figure 1.

The five characteristics of the categories of e-government value briefly discussed below explain their relationship to the political management strategies necessary to create an enabling environment for e-government alternatives. The first characteristic is that the categories are not mutually exclusive. A particular e-government application will likely provide value in more than one category and, in many instances, in all the categories. Secondly, in those cases where value is provided in more than one category, the value provided is unlikely to be distributed equally across the categories. An application is likely to provide most of the value in one or perhaps two categories and much less value in the remaining categories. Thirdly, the challenges of political management are different for each category and greater for the two politically derived than for the two market enhancing categories where value is more readily understood and accepted. Generally e-government applications that decrease transaction costs or stimulate aggregate demand will be more widely understood and accepted than those that are designed to decrease government agency operating costs or search for and implement politically defined value. Fourthly, within each category value can be affected by the technical and aesthetic qualities that determine an e-government Web sites functionality. In this regard the Center for Public Policy at Brown University does an annual survey that rates municipal, state, and federal government sites based on various aspects of their functionality. (West, 2004a) Fifthly, the total value produced may not be the sum of the values produced by the four categories. It is possible and indeed likely that an e-government application will produce some form of value that does not fit conveniently into one of the four categories.

## CONCLUSION

When faced with complexity it is natural to use what we know to attempt some categorization as a way of reducing confusion and perhaps improving our understanding. The e-government value categories: passive-market enhancing, active-market enhancing, passive-politically derived, and active-politically derived combined with their five characteristics do this more or less imperfectly. The main purpose in developing the framework is to assist public administrators to think about value so that they can:

- Determine whether or not an e-government application is valuable enough to be worth doing
- If worth doing, determine how public managers engage in political management strategies that create an enabling environment
- And finally, determine the operational feasibility of alternatives in conjunction with value and the ability to create an enabling environment

The framework of e-government value suggests research in two broad areas. First and foremost the framework must be rigorously tested. Improving the definitions by a controlled and documented process that asks observers to apply them to real e-government Web sites is

a beginning. Secondly, the fact that the categories may not account for the sum of value produced by e-government applications points to a potentially dangerous flaw in the framework. It could be that, despite the thought that has gone into them, the categories are simply inappropriate or, worse yet, misleading. An alternative is that some residual, uncategorized value will exist no matter how carefully the categories are devised. Insight into this should result from the application of the categories by public administrators.

With the framework presented here the value of e-government applications can be considered in a holistic way that provides public administrators with an understanding that will help them to create an enabling environment for e-government. This will result in better e-government solutions by providing higher levels of value to stakeholders.

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## KEY TERMS

**Active-Market Enhancing Value:** E-government value from market adjustments in aggregate demand.

**Active-Politically Derived Value:** E-government value from actively searching out and testing value definitions.

**Enabling Environment:** An environment that allows for and encourages the creation, maintenance, and implementation of e-government alternatives.

**Passive-Market Enhancing Value:** E-government value that results from the reduction of the cost of government imposed exchanges on citizens and making it more efficient to identify and charge costs to beneficiaries of government programs.

**Passive-Politically Derived Value:** E-government value from increased efficiencies in government operations that are not necessarily concerned with broader policy matters.

**Political Management:** Active engagement of public administrators in the political process that surrounds their operations.

**Stakeholder:** A person or group who has a vested interest in government action or in-action.

# Concern-Wide Information Management with the Dutch Police

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## INTRODUCTION

In The Netherlands, police ICT has always mirrored the organization of the police system. Until 1993, the Netherlands had 144 local police forces at its disposal, which were supplemented by a national police force. Since 1994, when the 1993 Police Act was enacted, the Netherlands has had 26 police forces. Twenty-five of those are regional forces, and one provides a few specialist police services on a national scale. Although the number of forces has declined steeply since 1994, a heavy stress is still put on regional autonomy, as the 1993 Police Act knows no provisions for cooperation among forces.

Until 1993, police informatization was primarily a local matter, but after the 1993 Police Act was enacted, it became a regional affair. The Police Act, therefore, did not put an end to the existing situation characterized by so-called *islands of automation*. The Dutch police still use many different information systems that often are incompatible, which seriously hampers the information exchange among forces.

Because of the sharp focus on regional autonomy and the lack of legal or other incentives to encourage cooperation, it is remarkable that the police have been striving toward the creation of a uniform and concern-wide information management in recent years.

In this article, we argue that with this effort, a federative common pool resource (CPR) is called into being that can be seen as a form of administrative innovation in which horizontal intergovernmental cooperation through self-regulation is the central point. Such horizontal cooperation is of huge importance to the Dutch police system, as it is highly decentralized and as central steering, which often has failed in the past, would come with high transaction costs. A CPR can be defined as a shared facility that supplies goods or services to those participating in it. Characteristic for a CPR is either that it diminishes from use and/or that its creation and preservation depend on the participants' collective actions.

The federative characteristics of the developments we describe are best interpreted by using Davenport's (1992, 1997) typology of types of information management. In this typology, five different models are distinguished: anarchy, feudalism, federalism, monarchy, and technocratic utopianism. Davenport's (1992, 1997) main message is that in practice, many organizations struggle with a shift from feudalism toward federalism, the model that he deems superior to all others, as it enables us to create a common information system without the use of central steering, which is so difficult to many organizations, including the Dutch police. Feudalism, the current situation with the Dutch police, is highly unwanted, as it comes down to organizations not sharing information, which seriously obstructs many activities.

Currently, the Dutch police are undergoing a transformation of the kind Davenport (1992, 1997) describes. Not long ago, its information management displayed strong feudal traits, but under pressure from central government over the past few years, the 26 Dutch police forces collectively have pursued the realization of a uniform concern-wide information management with, in Davenport's (1992, 1997) terms, federal characteristics.

Closely associated with these developments is the rise of a new institutional paradigm that differs strongly from the one currently existing in the Dutch police field and that already is influencing the (legal) base of the Dutch police system.

## THEORETICAL BACKGROUND: THE FEDERATIVE CPR

In November 2004, the council of those mayors that play the most important role in the Dutch police system (the so-called police administrators) drew up a plan for the innovation of the police's information management in the years 2005 through 2008. This plan and its predecessor (Regieraad ICT Politie, 2001) calls for the creation of a

uniform concern-wide information management for the entire police field. Uniformization, in this respect, amounts to "the gradual improvement of the information management, leading to a concern-wide dissemination of all police information and to the integral accessibility of such information. It means the end of 'islands of automation' in the police field" (Regieraad ICT Politie, 2004, p. 42).

The effort to bring about uniform concern-wide information management can be viewed as an attempt to create a CPR, as such an information management can only come into being if every police region participates. If some regions refuse to cooperate, the others will not have access to all the information necessary in order to fulfill their tasks. In this case, whether it will be brought about depends on whether a solution can be found for a specific type of collective action problem that is often called *assurance game* or *coordination game* (Ostrom, 1990). In an assurance game, shared provisions only will come into existence if all potential participants coordinate their actions and cooperate. Now, the creation of a CPR is often impeded by a collective action paradox—a dilemma between individual and collective rationality. As it happens, the creation of a collective facility is in the interest of the collective but does not necessarily serve the private interests of all individual participants. Nonetheless, that the Dutch police field appears to succeed in bringing about a uniform concern-wide information management is the result of the peculiar way in which it managed to solve the collective action paradox.

Davenport (1997) defines information management with federal characteristics as a form of cooperation in which "rational negotiation between central and dispersed groups" is central (p. 69). According to this author, "federalism treats politics including the politics of information as a necessary and legitimate activity by which people with different interests work out among themselves a collective definition of purpose and the means to achieve it" (Davenport, 1997, p. 69). The fact that in federalism binding decisions are brought about through self-regulation after negotiations open to all concerned parties is essential.

## A UNIFORM CONCERN-WIDE INFORMATION MANAGEMENT AS A FEDERATIVE CPR

Until recently, the Dutch police system did not account for any financial or legal incentives in order to encourage cooperation among police forces. The council of police administrators, to provide but an example of this lack of incentive, wasn't even mentioned in the Police Act of 1993 and, therefore, did not enjoy legal status (Wagenaar & Soeparman, 2003). Autonomy of the individual police forces prevails in the 1993 Police Act. Naturally, such a lack of incentives for cooperation has had an effect on the domain of information management, which, therefore, could be characterized as feudal. Feudal information management, according to Davenport (1997), is the situation in which fragmentation prevails over the making of connections "when business units … control their information environments like lords in so many separate castles" (p. 72), a lack of cooperation that seriously obstructs the exchange of information often so important to police work. Not surprisingly, therefore, the Dutch minister of the Interior still could write in 1999 that "the police's information management still lagged behind to that found in most other sectors" and "that broad consensus existed over the fact that the arrears in the field of ICT the Dutch police had run into were truly worrying" (Tweede Kamer, 1999-2000, p. 1).

The solution that was found for the problem was of a highly federal character. Two private law cooperations, of which all police forces are members, bring about ICT facilities for all the police forces together—a CPR. One of the cooperations is called Concern Information Management Police (CIP); the other is called ICT Service Cooperation Police, Justice and Security (ISC). Although the cooperations work together, they have separate responsibilities.

CIP handles the demand-side of police ICT. It develops the information architecture and the logical and functional requirements of information systems and draws up long-term policy plans. On behalf of its members, CIP also acts as principal for the development of new applications. The standardization of data and data interchange is an important part of its range of duties, as well. The members of CIP are the police administrators (Veranderorganisatie, 2001; Concern Informatiemanagement Politie, 2004).

The other cooperation, ISC, acts as supplier of police ICT. The police forces, the CIP, and other parties involved are its customers. ISC is responsible for the technical design, actual realization, testing, implementation, exploitation, maintenance, and project management of police ICT. It also has a consultancy function and advises about standards, support, and training of end users, research, and the best way to facilitate innovation. As is the case with CIP, it is the police administrators who represent the police forces in ISC (Veranderorganisatie, 2001; ICT Service Coöperatie Politie Justitie en Veiligheid, 2004).

ISC's sphere of action is wider than that of CIP, however, as ISC caters to more than just the police. The idea behind this wider sphere of action is that police information and communication systems are a link in a much longer chain that also includes the police's partners in the areas of, for instance, criminal justice, security, and immigration. More parties than just the police, therefore,

share a common physical ICT infrastructure. Together, the two cooperations bring about change and innovation of police information management and its connection to the police's partners.

The federative nature of the CPR, in this case, is expressed mainly in the fact that the general meetings of both cooperations know binding decision making. In these meetings, the 26 police administrators all participate to decide on the cooperations' yearly policy plans and budgets. Decision making is characterized by majority rule and by the fact that it is legally binding. Negotiations between the police forces and the cooperations always precede it (Bestek, 2005-2008).

As members of the two cooperations, the police forces transfer part of their individual powers of decision to the collective, thus establishing a self-regulative structure for the bringing about of a joint information management. It is this decision-making mechanism that enables the solution of the collective action problem peculiar to CPRs, especially the so-called provision problems that "concern the effects of various ways of assigning responsibility for building, restoring, or maintaining the resource system over time" (Ostrom, 1990, p. 47). A number of provision problems is caused by a self-fulfilling prophecy: as soon as the potential members of a CPR recognize it as a CPR and, therefore, realize beforehand how unlikely it is that it will come about, their willingness to partake melts into thin air, thus preventing the CPR from materializing before an attempt to create it even has begun. Such mechanisms mean that one actor, by refusing to partake, can prevent the entire CPR from coming into being. If all actors are aware of this, chances are high that they will not even try to bring about the CPR (Kollock, 1999). Yet, if one succeeds in calling a joint decision-making structure into being, which has the authority to enforce majority decisions, changes that the necessary CPR will materialize increase immensely, as this will make it easier to make collective rationality dominate individual rationality (Ostrom, 1990).

The Dutch police actually have succeeded in doing this. The CPR we describe indeed has come into being without making use of hierarchy. In the initial phase of its development, it was rather the shadow of hierarchy, to borrow a term from Scharpf (1997) that has been decisive. By making clear that it could intervene if the police did not succeed in establishing a joint information management, the home office acted as a catalyst in the process, which led to its coming into being (Wagenaar & Soeparman, 2005). Naturally, contingent factors like good personal relations among key actors also played a part in this process.

## THE FEDERATIVE CPR AS A FORM OF ADMINISTRATIVE INNOVATION

It is the ability to self-regulate that is characteristic of the joint information management that is being brought about through the two cooperations. To borrow from Van Duivenboden (2004), it is, a prime example of horizontal intergovernmental cooperation—cooperation between public bodies on the same level of government. Although a legal base for such cooperation was lacking, the police forces voluntarily handed over part of their powers of decision to the cooperations as organs of the federative CPR in which they partake. In so doing, they called a more-encompassing entity into being that has the means to bring about concern-wide dissemination and integral accessibility of all police information (Bestek, 2005-2008).

Thus, the domain of information management is an important seed-bed for possible further administrative innovation in the police field, as a new form of cooperation has been called into being there, combining strongly horizontal self-regulation with an orientation on the Dutch police system as a whole. It also acts as a means by which to make decisions binding by (private) law, a facility the Dutch Police Act (public law) until recently did not provide for. Only recently (2004) has the Police Act been changed to make forms of cooperation among police forces possible. CIP and ISC success has been an important reason for the amendment. The amendment, in turn, creates the possibility to create public law successors for the two cooperations, thus firmly embedding them in public service. In addition, it is sometimes said that the two cooperations might be forerunners of similar structures in other domains of the Dutch police system.

## FUTURE TRENDS: FIRST STEPS TOWARD A NEW INSTITUTIONAL PARADIGM FOR THE POLICE SYSTEM?

The police system, with its long-lasting relations among key actors and its shared view on how it should be organized, can be regarded as a particular policy community with its own paradigm (Hall, 1993). One could say that such policy communities are the outcome of an autocatalytic process in which the interplay of actors and structure constantly confirms and strengthens itself in long-lasting relatively stable relations. Associated with such a policy community is a paradigm specific for

its context, a lasting combination of formal and informal rules and norms, values, conventions, power relations, and visions of reality shared to a high degree by its members.

The Dutch police system's existing institutional paradigm is determined by a number of intertwined topics: the separation of authority and administrative management, the separation between a judicial and an administrative police function (maintenance of public order vs. criminal investigation), and the neither local nor national character of the Dutch police (Wagenaar & Soeparman, 2003). Discussions on the design of the Dutch police system, therefore, either are vertically (centralization vs. decentralization) or functionally (maintenance of public order vs. criminal investigation) oriented, and are concerned with structure (size and number of police forces). In practice, this results in a police system that is functionally and territorially oriented in its organization and administered via a classic functional hierarchical model. The police forces form autonomous isles, and the connections among them have not been institutionalized.

The federative CPR in the police system, both the two cooperations and the coming into being of a uniform concern-wide information management, could be associated with a new paradigm because of its horizontal character . This would be a Hammerian paradigm of organizations sharing information, products, and services through a joint information infrastructure, which would be standardized and homogenized in every aspect. According to such a paradigm, organizations substitute an orientation on functions for a process orientation and act as links in a chain directed at the creation of added value (Hammer, 2001). In such a paradigm, the police would be regarded as an interdependent link in, for instance, the criminal justice system and would work territorially, deconcentrated but according to a single uniform criminal investigation process, and would be supported by a uniform concern-wide information management. Similar images can be conjured up for other police work processes; for instance, in the field of crisis and contingency management in relation to the activities of other emergency services.

With the possibility to create forms of cooperation, the Police Act, since 2004, has provided for elements of the new paradigm to e to come to the surface in a police system that is still heavily under the old paradigm's sway.

## CONCLUSION

Is the CPR described in this article and the administrative innovation to which it leads, by means of its horizontal character, sufficient conditions for success? Will it guarantee the actual coming into being of shared services in the police system's information management supporting its effectiveness? Obviously, the answer to these questions must be negative. The actual coming into being of joint information management is subject to a number of basic factors; for instance, the logic of grand projects (always too expensive, too late, etc.), the capacity for implementation of the various police forces, and a police culture in which sharing of information always has been disapproved of. Therefore, it will take many years for the police's concern-wide information management to be an enabler for the police system's effectiveness. Yet, that does not alter the fact that the innovations sketched previously have removed an important barrier to change. Such change easily could spill over to police activities other than information sharing; for instance, the joint purchase of materials. It also could provide an example to the many other decentralized services that are confronted with problems similar to those of the police. Examples are the (Dutch) health sector or the realm of (small) municipalities, the first being highly fragmented in nature and in need to devise ways to exchange patient information among general practitioners, hospitals, and insurance companies, and the second being highly fragmented by construction and in need of devising all kinds of cost-effective services to citizens but hampered by limited economies of scale.

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## KEY TERMS

C

**Administrative Innovation:** Forms of innovation that focus on the introduction of new forms of governance (steering, policy implementation processes).

**Collective Action Problem:** A dilemma between individual and collective rationality in which rational individual action can lead to a strictly pareto-inferior outcome; that is, an outcome that is strictly less preferred by all individuals collectively than at least one other outcome.

**Common Pool Resource (CPR):** A shared facility that supplies goods or services to those participating in it, which diminishes from use and whose creation and preservation depend on the participants' collective actions.

**Federative Common Pool Resource:** A CPR in which all of the participants have agreed to govern collectively the allocation of goods or services through prior negotiation, thus ensuring their continuing supply to all participants.

**Information Management:** The administration of information, its uses, and transmission, and the application of techniques to create, modify, or improve information-handling systems.

# Configurable Reference Process Models for Public Administration

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## INTRODUCTION

For the last couple of years public administrations increasingly face a modernization and performance gap which they try to close by reorganizing their processes. Reference models can provide added value in improving those processes and procedures. Their main characteristics, the storage for domain knowledge and their universal validity, create a high potential for reuse and therefore allow for the exploitation of synergies and the reduction of unnecessary tasks and redundancies. In order to reduce the amount of resources for adapting reference models to regional specifics the application of configurable reference models is especially useful and proposed in this article.

## BACKGROUND

During the last years public administrations have started to focus on their processes (Falck, 2002, p. 137; Lenk, 1997), and with the increasing diffusion of electronic government (Becker, Algermissen, Delfmann, Falk, & Niehaves, 2004a) a rising number of reorganization projects have been started to close the modernization and performance gap (Budäus & Schwiering, 1999, p. 145). Information models have proven to be an adequate solution to cope with the complexity of these reorganization projects. In order to reduce the modeling expenses on the one hand side and to allow for a reuse of existing "best-practice" or "common-practice" models on the other side the application of reference information models has been discussed in the domain of public administrations more thoroughly (Lenk, 2002).

This is especially true for the European public domain. Therefore, this article focuses on the given EU context and takes Germany as an example. In Germany—especially on a local level—the potential for a transfer of reference solutions is very high because a quite regulated legal framework creates a high level of task similarities and structural analogies between the 14.000 different municipalities.

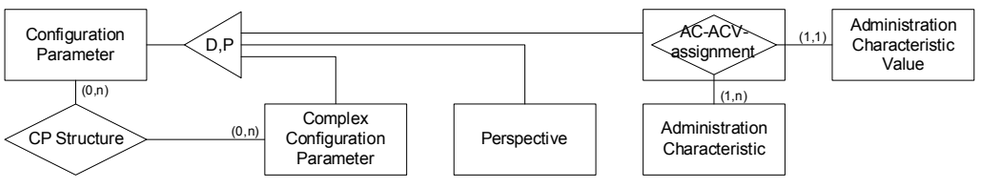
Existing contributions of the literature mainly formulate universal reference frameworks which do not take into account different process variants that are specific to certain administrations (Lenk, 2002). But there are certain variations in public administrations that are caused by the federal system which implies having different laws and regulations on a state, regional and local level. The application of reference models for public administrations therefore requires an adaptation to regional and local specifics.

First, this causes an additional customization effort for an administration using a reference model. Second a general increase of maintenance effort can be expected for all users of the reference models when changes in laws and regulations make a revision necessary.

A good idea to reduce the efforts mentioned is to consider regional specifics during the construction phase of reference models. This approach leads to an increased customization effort for the creator of the reference model.

However, the additional effort can be partly compensated through effects of scale, which are created through the applicability of different model variants for a large number of public administrations. In this context an additional requirement is a non-redundant integration of variants in the reference model as the public domain is faced by continuously changing laws and regulations.

*Figure 1. Configuration parameters*




Regular adjustments in redundant models create a non acceptable effort, especially when adjustments consider a lot of different models as it is the case in the domain of public administrations.

If reference models integrate different variants free of redundancies adjustments are only necessary once. The relevant variants for a specific administration should be easily derivable from the existing reference model by automatic methods. One example could be to select a certain state and hence deliver the process variants including specific state regulations. The main goal of this contribution is to apply an existing approach for a redundancy free management of variants in reference process models to the domain of public administrations. Hence we follow the demand for cheap but high-quality information models.

## CONFIGURATIVE REFERENCE MODELING AS A FOUNDATION FOR THE MANAGEMENT OF VARIANTS

In order to integrate variants into reference models as well as to generate these variants automatically based on adaptation criteria, the concept of configurative reference modeling is considered as an adequate approach (Becker, Delfmann, Dreiling, Knackstedt, & Kuropka, 2004b). Configurable reference models contain rules that specify which model elements and model sections are relevant for which application context. Non-relevant model sections are hidden. On this basis, model variants can be generated by performing configuration mechanisms that are dependent on specific criteria (configuration parameters) (Becker et al., 2004b). Configuration parameters can be specialized in administration characteristics and their values (AC/ACV), perspectives as well as complex configuration parameters that are both based on perspectives and AC/ACV. This interrelation is illustrated in Figure 1 as Entity-Relationship Model (ERM, cf. Chen, 1976).

An administration characteristic can be represented by the affiliation of a certain administration to a federal state or by the number of inhabitants. Perspectives consider that different user groups are characterized by different requirements according to the conceptual and representational format of the used models (Darke & Shanks, 1996; Rosemann, 1998; Rosemann, Schwegmann, & Delfmann, 2005).

In order to reduce the modeling complexity both for reference model developers and reference model users, it is reasonable to provide configuration mechanisms with different impacts on the models. Therefore, configuration mechanisms that operate on models and those that operate on the modeling language are distinguished (Becker et al., 2004b):

- **Model Type Selection:** Model types represent result types of special modeling languages. The relevance of model types is dependent on the actual perspective. For example, different user groups prefer different modeling languages in order to model the same circumstance. The configuration mechanism of model type selection provides the perspective-specific selection of model types and hiding of those that are not relevant for the actual perspective.
- **Element Type Selection:** This mechanism admits the building model type variants. Model type variants differ in the number of valid element types and thus in their expressive power. Users from different perspectives naturally prefer model types with a different expressive power (e.g., due to their different skills).
- **Element Selection:** Element selection allows the assignment of single models, model sections or model elements to configuration parameters. For example, for cities with different inhabitant numbers, different branches of administrational processes are relevant. Non-relevant branches can be faded out by applying element selection.

- **Synonym Management:** This mechanism considers different naming conventions that are valid in different administrations. For example, it is synonymously spoken of "invoice" and "bill" in different administration departments, whereas these denotations have the same meaning. With synonym management, these denotations can be exchanged dependent on the actual configuration parameter value.
- **Presentation Variation:** The assignment of different symbols to model element types and the assignment of different topological adjustments of model types are achieved by presentation variation. For example, users groups differ in their preferences concerning the reading order of process models.

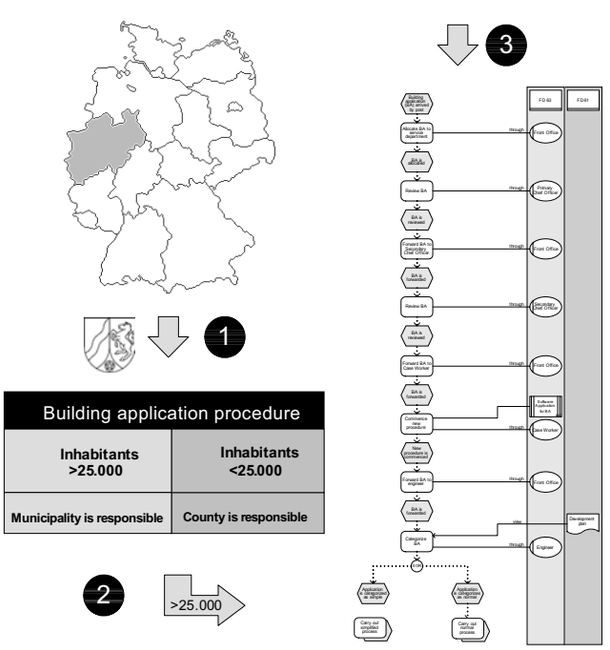
## CONFIGURATIVE REFERENCE MODELING OF THE BUILDING APPLICATION PROCESS

As an application example for the configurative reference modeling in public administrations we show the building application procedure. As the building law lies in state responsibility the first step of configuration is to select the state for which the reference model has to be created (see Figure 2). In the example the German state North Rhine Westphalia has been selected. In each state the procedures are different according to the inhabitants of a certain county or city.

In North Rhine Westphalia only municipalities with more than 25,000 people have their own building application authorities. The authorities for smaller municipalities are concentrated on the county level. As a result, the second step of configuration is the adaptation of the reference model according to the amount of inhabitants. In the example, a municipality with more than 25,000 people has been selected. For both configuration steps the proposed element selection is suitable.

The third step is the selection of the model users' perspective. By selecting different perspectives and the use of configuration mechanisms different aspects of the total model can be varied. One example is the possibility to use the concept of element type selection to hide certain resource types which are annotated in the overall model but irrelevant for a certain perspective. The IT department for example is mainly interested in the annotated resource type information system while the organization department is mainly interested in the annotated organizational units.

*Figure 2. Configuration of a reference model for the building application procedure*




## FUTURE TRENDS AND CONCLUSION

Structural analogies can be identified between different administrational processes within a public administration and, in a higher grade, between similar processes of different administrations. In the course of an expansive process oriented modernization of public administrations, reference process models can serve as a repository of domain knowledge in order to handle the complexity of eGovernment projects and to accelerate their realization. However, up to now, only few attempts have been done in generalizing the knowledge gained in administrational reorganization projects and in documenting it in concrete reference models. Hence, further efforts have to be enacted in order to develop generalization criteria for information models as well as to formulate reference models for public administrations. Furthermore, in the construction of configurable reference models, configuration mechanisms have to be developed that are easy to use. Primarily, administration staff, who are not necessarily skilled in modeling methods, have to be enabled to perform configurations themselves. Thus, the applicability of configurative reference modeling implies the development of an according modeling tool that implements the proposed concepts.

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## KEY TERMS

**Administration Characteristics:** Describe differences between public administrations that determine different information models as relevant for different administrations.

**Configurable Reference Models:** Contain rules that specify how the model has to be adapted to specific application contexts.

**Configuration Mechanisms:** Transform configurable reference models in context specific reference models. Model sections or model elements that are not relevant for a certain application context are hidden.

**Configuration Parameters:** Comprise perspectives and administration characteristics and are used as input parameters for configuration mechanisms.

**E-Government:** Entails the simplification and implementation of information, communication and transaction processes, in order to achieve, by means of information and communication technology, an administrative service, within and between authorities and, likewise, between authorities and private individuals or companies.

**Perspectives:** Represent requirements of different user groups according to the conceptual and representational design of information models.

**Reference Models:** Information models that are reusable for different, even though similar application contexts. In terms of their reuse, they have to be adapted to the actual application context.

# Content Production Strategies for E-Government

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## INTRODUCTION

The terms *electronic government* (*e-government*) and *digital government* are used to refer to the utilization of the Internet and other information and communication technologies (ICT) effectively in public sectors. In e-government development activities, the concern is often in building new means to support and strengthen democracy (e.g., Watson, Alselsen, Evjemo, & Aarsæther, 1999). In other cases, the main concern may be in supporting the work of people in public sectors (e.g., Mustajärvi, 2003), or in building new kinds of services for citizens (e.g., Lyytikäinen, Tiitinen, & Salminen, 2000). Common to most development activities is the need to have the content of public sector information repositories available on information networks, including the Internet, extranets, and intranets of particular organizations.

The content production practices have a major effect to what extent digital content is accessible and how well the content supports e-government goals. In planning new kinds of e-government solutions, it is important to understand the different alternatives for producing information assets and the consequences of the solutions. In the digital era, the actors on public sector have to update continuingly their content production strategies and practices for effective ICT utilization.

In this article, we will introduce three strategies for content production and discuss the practices related to the strategies. We will also evaluate the benefits and challenges of each of the strategies. We will demonstrate the strategies and practices by examples from the Finnish legislative environment. Data about the case environment has been collected during long-term collaboration of researchers at the University of Jyväskylä with the Finnish Parliament and ministries (Salminen, 2003).

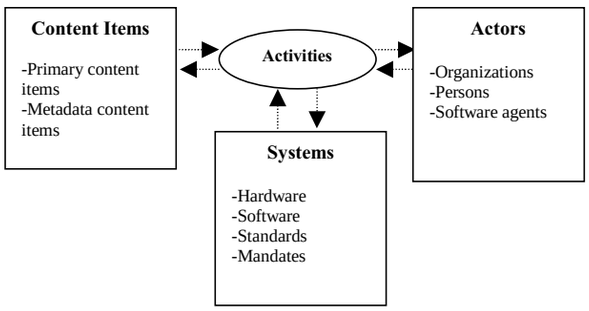
## BACKGROUND

Documents have traditionally been important in public sectors to record rules, applications, decisions, and decision histories. A great deal of the content of digital information repositories is stored either as documents or as metadata related to documents. Information technology has provided powerful tools for authoring and distributing documents in digital form and new document genres have evolved. The Internet has facilitated new kinds of communication both within the public sector and with citizens outside. Digital information repositories are expanding rapidly and more systematic rules and practices concerning content production and organization of the content are needed.

Our analysis of the content production strategies will be based on the content management model depicted in Figure 1 (Salminen, 2003). The model shows two types of entities in a content management environment and information flow between them. The information flow is depicted in the figure by the arrows. All information flows are related to activities depicted by the oval.

An *activity* is a set of actions performed by one or more actors in a process. In the public sector, the process can be, for example, legislative or budgetary process. The

*Figure 1. Information flow in a content management environment*




entities depicted by rectangles in the figure represent information resources. There can be three kinds of resources corresponding to their different roles in the activities: actors, content items, and systems. An *actor* is an organization or a person, in the contemporary and future network environments also software agents can perform as actors. In the budgetary process, for example, Ministry of Finance is one of the organizational actors and Minister of Finance is one of the human actors. *Systems* consist of the hardware, software, standards, and mandates used to support the performance of activities. Mandates can be, for example, regulations and legislation governing the content management of the domain. *Content items* are documents and other addressable units of stored data intended as information pertaining to the activities of the domain. Content items may be clustered in *collections* and *metadata* associated with the collections. Metadata provides information about the content items of a collection and about their production, storage, and use environments. If metadata is accessible in the activities of the environment as content items of their own, then it is possible to talk about two kinds of content items in the environment: *primary content items* and *metadata content items*.

In the analysis of the next section, we will consider the Finnish legislative environment as a case of a public sector content management environment. The legislative process is an example of a complex interorganizational process participated by many organizations, among them the government, ministries, the parliament, and the president of the Republic. Hundreds of people in these organizations participate in the work and content production. The time for developing a new law may take from a couple of months to several years. Dozens of different document types are produced within the legislative work, annually thousands of documents and tens of thousands of original pages. In the parliament alone, about 40,000 original pages are published per year. Information about the legislative activities and results of the activities are available on the public Web pages of the ministries and the parliament. The Otakantaa.fi service provides some opportunities for citizens to discuss and express their opinions related to the legislative activities. ICT is utilized in all organizations involved, and in the communication of people participating in the process. A number of intranet systems, extranet systems, and various software applications are used during the process. Advanced content production and document management strategies are important in the environment to facilitate effective work processes and building flexible e-government services.

## CONTENT PRODUCTION STRATEGIES

We have identified three different content production strategies: traditional, structured, and holistic. Table 1 shows the system basis for the strategies. In the *traditional strategy*, word processors, file systems, and database systems create the technological basis of content production. Word processors are used to produce text documents and file systems to store them. In the *structured strategy*, not only the database content but also the document content is in structured form. The Standard Generalized Markup Language (SGML) (Goldfarb, 1990), its more streamlined subset Extensible Markup Language (XML) (Bray, Paoli, Sperberg-McQueen, Maler, & Yergeau, 2004), and the SGML application HTML (HyperText Markup Language) create the basis for the management of structured documents. The *holistic strategy* is based on the use of XML and Semantic Web technologies (http://www.w3.org/2001/sw/). The goal in this strategy is to enable the creation of rich metadata and flexible cooperation of computers and people. In the following, we will discuss more of the strategies. At the end, we will evaluate the benefits and problems of each of the strategies.

### Traditional Content Production

The traditional content production is characterized by a clear distinction of document content and database con-

*Table 1. The system basis of the three content production strategies*

| | |
|---|---|
| Traditional | Word processors, file systems, database systems |
| Structured | SGML, XML and HTML as document standards |
| Holistic | XML technologies and Semantic Web technologies |

tent. Document content is produced by people using word processors, database content by software applications. Documents are used as units of communication between people. The reuse of parts of a document in other documents requires either retyping of the text or using copy-paste capabilities of the document authoring tool. In each software application, its own kind of metadata is created, in its own format, and similar kind of metadata may be created for the same document in different phases of the document life cycle. Metadata about documents is mostly created by the human actors. In using a word processor, the author can embed metadata to the document by giving values to some predefined properties, like author, subject, and keywords. Information about the external representation (layout) of the document is embedded in the document. If the document has to be stored as an official record, then external metadata about the document is created in a diary system or some other kind of records management system. The same data is often typed several times since the systems do not communicate with each other. In an interorganizational process, partly the same metadata is created for one document in several organizations.

As an example, let us consider some content production activities during the lifecycle of a Government Bill in the Finnish legislative process. A civil servant of a ministry prepares the bill by Microsoft Word. Same type of external metadata concerning the legislative process and related documents is produced into four separate systems: the governmental project register, the case management system, a document management system, and a diary system of a ministry. Before the bill is printed for the government plenary session, an assistant edits it using style properties of the Microsoft Word. After the president's decision to send the bill to the parliament for discussion the bill is published by a printing house both in paper format and in PDF format on the Internet (http://www.finlex.fi). The secretary of government sessions completes metadata about the case into the case management system and sends the Bill as a word processor file and as a paper document to phe Parliament. The parliament publishes the bill on the Internet (http://www.eduskunta.fi).

## Structured Content Production

In a structured content production environment, documents are stored as *structured documents* where the structure definitions, document instances, and layout specifications can be handled as separate content items. The use of open standards like SGML and XML facilitates the manipulation and use of documents by different software applications. Automated creation of new content items is possible. Since the layout of documents can be defined by separate style sheets, the same content can be distributed in different forms, for example, for different media.

HTML as an SGML application is in use in many environments where the structured content production is not applied otherwise. HTML documents are created either as static documents, for example, by using an HTML editor, or dynamically at the time of the HTML page access. Parts of the content on the page can be accessed from databases. Metadata about an HTML document can be embedded in the document and processed and manipulated by HTML aware editors.

HTML has been widely adopted for Web publishing since the specification of the language has been available without costs and HTML browsers are available for all having a connection to the Internet. The use of SGML/XML for other purposes than Web publishing usually requires the development of the particular SGML/XML based language for the purpose. Thus an essential activity in the structured content production is the development of document standards. The adoption of the new standard may require major changes in the content production practices and tools. Therefore the standardization process has to include, together with the development of standards for documents, redesign of work practices and tools used in document production (Salminen, Lyytikäinen, & Tiitinen, 2000).

SGML/XML content may be produced by human actors or automatically by a software system, for example, in the ways presented in Table 2.

*Table 2. A List of ways for SGML/XML content production*

| |
|---|
| • Using a syntax-directed editor which validates the content in respect to the structure definition<br>• Transforming the content of a word processor file automatically to a structured document using the structure information attached to styles<br>• Creating the structured content from database content by the export capabilities of the database system<br>• Using word processors or Web browsers with XML support<br>• Creating the content into an XML database, either by a human actor or by a software application |

Structured content offers possibilities for gathering and reusing metadata about content items (semi)automatically by transformations on the grounds of standardized content structures inside and between organizations (Bayerl, Lüngen, Goecke, Witt, & Naber, 2003). If XML is used as the format also for metadata content items, there is a possibility to use the same systems for the production of primary content and metadata content.

SGML based structured content production is in use, for example, in the Norwegian Parliament and ministries (Sundholm, 1997), the Supreme Court of Canada (Poulin, Lavoie, & Huard, 1997), the Tasmanian government (Arnold-Moore, Clemes, & Tadd, 2000), and also in the preparation of the Budget of the European Union (Catteau, 1997). XML has been considered as a basis for document production, for example, in Estonia (Heero, Puus, & Willemson, 2002) and United States Congress (Carmel, 2002). The Finnish parliament has adopted the structured content production strategy for the parliamentary documents. The document standardization was activated in 1994 and by the end of 2002, the SGML implementation covered all parliamentary legislative documentation (Salminen, Lyytikäinen, Tiitinen, & Mustajärvi, 2001). In the Parliament, the proposal of law text included in Government Bill is converted into SGML format. The structure is reused in the creation of the Special Committee Report and parliament's reply. The tool for structured production of parliamentary documents is FrameMaker+SGML providing document type specific applications with several layout definitions. Documents are stored both in SGML and PDF format into the text database, and are available on the Internet. HTML document is created dynamically from SGML. For the Parliament's answer to the government also Word document is created from SGML. Structural metadata is used, for example, for the extraction of index terms from the documents and to support information retrieval.

## Holistic Content Production

The emphasis of the holistic content production strategy is in systematic metadata solutions to cover the important information resources of the environment. The metadata is intended to support information management in the activities of the environment and effective cooperation of computers and people. Primary content items can be produced either by the traditional or structured content production practices. In the strategy, XML and Semantic Web technologies are important means to support interoperability of various software systems. The Semantic Web technologies provide XML-based languages to describe metadata. Special concern in the Semantic Web solutions is in the utilization of the semantic metadata (Berners-Lee, Hendler, Lassila, 2001).

The core standards used in this strategy include, in addition to XML, the resource description framework (RDF) (Klyne & Carroll, 2004) and the Web Ontology Language (OWL) (McGuinness & van Harmelen, 2004). RDF provides a model and an XML-based language for representing metadata related to Internet resources, whereas OWL can be used for defining formal vocabularies to facilitate interoperability of software applications.

According to this strategy, metadata is produced as automatically as possible. Recent prototype systems prove that authoring of informative, structured content, and automatic or semi-automatic creation of metadata is possible in some extent within a single software system (e.g., Brun, Dymetman, Fanchon, Lhomme, & Pogodalla, 2003). Descriptive metadata still needs to be created manually, for example, by using metadata forms integrated in document authoring systems.

Public sector standardization activities started in many countries strongly support the holistic approach. Examples of the activities are the Austrian eGov project (Wimmer, 2002), the Danish Infostructurebase (http://isb.oio.dk/info/) and the e-GIF service in the Great Britain (http://www.govtalk.gov.uk/). Such standardization activities have also been initiated within the Finnish public sector. A special research and development project called RASKE2 (http://www.it.jyu.fi/raske) has been initiated to investigate the metadata requirements of the legislative environment. Currently the legislative process as a whole lacks standardized metadata schema and metadata repository. Metadata is fragmented between 13 ministries, the Parliament, and some other organizational actors involved. For example, keywords of the legislative case are created separately in the Government and the Parliament during the process. Due to this fragmentation and lack of established practices the utilization of metadata in the content production is currently very limited (Lehtinen, Salminen, & Nurmeksela, 2005). The most important metadata lacking today and needed to facilitate the holistic approach is the resource identifier.

## Evaluation

The strategy of traditional content production is simple for producers of software applications and systems analysts, because they need not to consider inter-communicational aspects of systems. For content producers this strategy is familiar but often requires retyping of the same data into various systems.

Structured content production entails well known advantages like rich information retrieval capabilities,

information reuse, multichannel publishing and long-term accessibility of information stored in documents. As a disadvantage this strategy requires demanding standardization process and changes in the traditional work practices.

The holistic content production produces standardized metadata about all important information resources in the content management environment. The metadata supports system integration, information retrieval, and collaboration of people in work processes. Standardized metadata offers a basis for applying Semantic Web technologies and utilizing the metadata solutions developed for related domains. As a disadvantage, this strategy also requires extensive standardization. The standardization of the semantic metadata may be particularly difficult. Legal information is an example domain where finding agreements about concepts and their relationships is extremely challenging. Another challenge lies in immature state of technology and applications. Although XML is currently quite widely accepted and used, there are not so many tools that enable the utilization of higher level languages in Semantic Web (like RDF and OWL).

## FUTURE TRENDS

Current e-government activities for metadata standardization are leading towards holistic content production and new kinds of e-government services. The services will require effective interaction between the software applications. The World Wide Web Consortium is currently developing solutions for Web services in order to provide standard means for the interoperation of applications independent of their implementation platform (http://www.w3.org/2002/ws/Activity). Adding semantic metadata to the descriptions of Web services aids identifying the service that is suitable for the desired needs. By the support of Web services different applications can participate in producing the content for governmental purposes. As an example consider the early phases of producing law initiatives or government bills. The user could give a task to a system to contact the Web services provided by each ministry and the Parliament to browse all initiatives—or other documents and information—related to the issue he or she is currently working with. This way the possibility of unintentional parallel work in law preparation could be reduced. Simultaneously to the browsing of ministerial services, the system could also contact the international news services and search for the news items related to the law initiative. Due to the international characteristics, Web services providing translation between languages could also be utilized.

## CONCLUSION

The article described three strategies for content production in e-government environment: traditional, structured, and holistic. Each of the strategies has its own strengths and weaknesses which should be taken into consideration when planning new practices. The choice of a content production strategy effects on the extent the produced digital content is accessible and how well the content can be used to support e-government goals.

Currently, most of the content production in public sector can be characterized as traditional. In many environments the structured production concerns only HTML documents. The holistic approach is however at the moment a common tendency supported by development activities in many countries.

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## KEY TERMS

**Content Items:** Documents and other addressable units of stored data intended as information pertaining to the activities of a domain.

**Extensible Markup Language (XML):** A markup language for representing information as structured documents. A streamlined subset of the earlier language called SGML (Standard Generalized Markup Language). XML was developed particularly for the purposes of information management on the Internet and to facilitate easier implementation than SGML.

**Metadata:** Data about data. In the context of content production provides information about the content items of a collection and about their production, storage and use environments.

**OWL Web Ontology Language:** Used to represent the meaning of terms in vocabularies and the relationships between those terms. This representation of terms and their interrelationships is called an ontology. Intended to be used when the information contained in documents needs to be processed by applications, as opposed to situations where the content only needs to be presented to humans.

**Resource Description Framework (RDF):** A general model for the metadata describing Web resources (or resources in general). The concrete syntax of RDF is given by XML.

**Semantic Web:** An extension of the current Web where information resources are attached with metadata

to support both people and computers to work in co-operation. The metadata is intended to give well-defined meaning to resources and to support automated reasoning about meaning and trustworthiness of resources.

**Structured Document:** Has explicitly indicated structure consisting of named parts so that software applications can identify, retrieve, and process those parts. The structure can be defined by a structure definition for a class of documents. XML is a language for representing and defining structured documents.

# Continuity of Operations Planning and E-Government

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## INTRODUCTION

Continuity of operations (COOP) planning, sometimes referred to as disaster recovery planning, business continuity planning, or business resumption planning, is a segment of contingency planning that refers to the internal effort of an organization, such as a branch of government, department, agency, or office, to assure that the capability exists to continue essential operations in response to a comprehensive array of potential operational interruptions. In government, COOP planning is critical because much of the response to an incident might include the maintenance of civil authority and infrastructure repair, among other potential recovery activities. All such efforts presume the existence of an ongoing, functional government to mobilize, fund, support, and oversee recovery efforts. In an emergency, government is likely to need to ensure the ability to communicate with internal and external constituencies. This function is becoming associated with electronic government. For example, many people in the United States and elsewhere, when searching for information and guidance following the September 11, 2001 attacks, turned to government agency Web sites. Beyond such extraordinary examples, the growing public expectations of e-government has put additional pressure on the need to reconstitute systems quickly after an interruption to minimize any disruptions and financial costs associated with a major infrastructure failure.

Government COOP planning may be regarded as a "good business practice," and part of the fundamental mission of agencies as responsible and reliable public institutions. Comprehensive contingency plans, perhaps once viewed, at the least, as optional and, at the most, as a prudent measure, are now seen as an integral part of developing and maintaining an agency's capacity to carry out its essential functions. Continuity planning professionals assert that the perception of a changing threat environment and the potential for no-notice emergencies, including localized acts of nature, accidents, technological emergencies, and military or terrorist attack-related incidents, have increased the need for COOP capabilities and plans that enable agencies to continue their essential functions across a broad range of potential emergencies. COOP planning can be viewed as a continuation of basic emergency preparedness planning, including evacuation planning, and serves as a bridge between that planning and efforts to maintain continuity of government in the event of a significant disruption to government activity or institutions. In the aftermath of an incident, initial efforts typically focus on safeguarding personnel and securing the incident scene. Subsequently, attention focuses on reestablishing critical agency operations according to a COOP plan. Because the number and types of potential interruptions are essentially infinite, effective COOP planning must provide, in advance of an incident, a variety of means to assure contingent operations.

In the context of e-government, the heavy reliance upon information technology to carry out mission critical tasks and provide other citizen services highlights the need to ensure these assets are robust, protected, backed up, and resilient to interruption. COOP is not a new idea. While contingency planning has gained considerable attention in recent years due to heightened security concerns and increased dependence on information technology, modern government continuity planning has been practiced, in one form or another, for several decades. What may now be emerging is a recognition that all organizational assets, in the case of government, this would include leaders, civil servants, and information infrastructures, must be incorporated into organization-wide contingency planning.

## EVOLUTION OF GOVERNMENT CONTINGENCY PLANNING

Government contingency planning grows out of two major streams. One stream, COOP planning, focuses generally on the preservation of staff, facilities, technology systems, and data. The other stream, sometimes identified

as continuity of government (COG), typically focuses on preserving government leadership and high-level officials. Depending on the scope of an operational interruption, COOP and COG plans could be initiated independently or in concert with one another. The failure of the network supporting a regional or national e-government program could be a COOP event. The failure of such a system as a result of war or terror attack on government facilities could also be a COG event if critical national functions are interrupted, or leaders are the target of the incursion. Due to the wide variety of potential operational interruptions, it is all but impossible to make a firm delineation between COOP and COG activities used to support e-government programs that could be generalized across all nations. As a consequence of security concerns, current government contingency plans, whether they are those that focus on localized or low level operational interruptions, or those that threaten the safety and welfare of state leaders, are not public information, and are not widely available within government. The history of government contingency planning strongly suggests, however, that it is reasonable to assume that contingency planning for government leaders, their staffs, and the facilities that support government operations are closely interrelated.

Leadership preservation is the more longstanding contingency practice. For example, Tanfield (1991) found that, before World War II, there was a confidential plan for the evacuation of the United Kingdom's Parliament from Westminster to a secret location (later revealed as Stratford-Upon-Avon) prior to the commencement of hostilities, although this plan was never used. During the war, Parliament was forced to convene outside of its traditional setting after the chambers of the House of Commons were destroyed during an air raid. For the remainder of the war years there was a ban on disclosing the location of Parliament. Similarly, the governments of The Netherlands and France continued to operate from abroad while their nations were occupied.

In the United States, Cold War efforts to preserve leaders and institutions of government focused on preserving the continuity of government in the event of a nuclear conflict with the former Soviet Union. Federal contingency planning focused on preserving the line of presidential succession, by safeguarding officials who would succeed the president. Also, Cold War era plans reportedly included locating and evacuating the officials in the line of succession, along with the other senior leaders of cabinet departments, as well as members of the U.S. Congress and justices of the Supreme Court. In the event of an imminent nuclear attack, the plans called for the relocation of these individuals to secure, alternative operational facilities outside of Washington, DC (Blair, Pike & Schwartz, 1998; Gup, 1992a, b; Zuckerman, 1984).

As leadership-focused plans evolved, it was recognized by emergency planners that it could be necessary to support the country's senior leadership, or to carry out critical functions in the aftermath of an attack, regardless of the need to evacuate and relocate government officials. Consequently, COOP planning became a unifying element that integrated support functions in situations where the lack of such basic support components as personnel, alternative operational facilities, information technology assets, or records posed the potential threat of serious disruption to operations and the ability of the government to provide services and carry out its duties.

In the period following the end of the Cold War, and reinforced by experiences surrounding the September 11, 2001 attacks in the United States, the March 11, 2003 train bombings in Spain, the July 7, 2005 attacks on the London Underground, and attacks on diplomatic and commercial facilities around the world in the past ten years, contingency planning has evolved. Once considered as remote possibilities, the permanent loss of a facility, or the impairment of staff due to radiological or biological contamination, while still unlikely, are now taken more seriously. Recently, for example Cracknell and Elliott (2005) reported that the United Kingdom Parliament, which has not been denied the ability to use its primary facilities since 1681, exercised its plan to relocate Members of Parliament from the Palace of Westminster to another facility approximately 50 miles away from central London. Nevertheless, contingency planners have recognized that contingency plans based on Cold War era assumptions that included a period of warning before an attack, are inadequate protection in a threat environment characterized by potential sudden, localized terrorist attacks by non-state actors that could include the use of weapons of mass destruction (Bhambhani, 2001; Milbank, 2001; Pressley & Hsu, 2003). Accordingly, attention to contingency planning has extended to and incorporated planning to protect vital information technology (IT) assets.

As with the stream of planning that focuses on preserving leaders and staff, government (COG) IT disaster recovery planning has evolved with advances in technology, equipment, and information resources over the past 25 years. At various times, disaster recovery planning preparations have been incorporated into infrastructure and software upgrades deployed in response to emerging events, such as Year 2000 (Y2K) planning, the successive waves of computer virus and worm incursions, and physical attacks on people, buildings, and infrastructures.

While much of the current attention to COOP planning focuses on responding to potential attacks, operational interruptions that are more likely to occur and could necessitate the activation of a COOP plan include routine building renovation or maintenance; mechanical failure of heating or other building systems; fire; and inclement

*Table 1. Potential interruptions and consequences*

**Potential Interruptions**

- **Natural Disasters**: Storm, flood, earthquake, tsunami, hurricane, cyclone.
- **System or Equipment Interruption**: IT, telecommunications, or power infrastructure failure, labor action.
- **Accidents**: Fire, gas leak, construction damage, motor vehicle accident, industrial accident.
- **Malicious Damage**: Security breach, sabotage, theft, vandalism cyber attack, media leak.
- **Military or Paramilitary Attack**: War, terrorism.

**Potential Consequences**

- Loss or destruction of vital records or information
- Loss of critical resources including power, water, office facilities, security systems, and supplies
- Loss of critical support functions including payroll, finance, administration, and internal communications
- Loss of key personnel
- Loss of capacity to provide public services

weather or other acts of nature. Other events that might interrupt government activity include industrial action, failure of information technology (IT), telecommunications, power or other critical infrastructure due to malfunction or cyber attack. Table 1 summarizes the potential incidents that could cause COOP plans to be implemented

Because it attempts to incorporate all facets of organizational operation, COOP planning is multidisciplinary in nature. Professionals in emergency management, information technology, physical security, human resources, facility management, and other specialties could contribute to COOP planning, or lead recovery efforts during an incident. While attention has been growing over time, this multifaceted undertaking can often be a very challenging and frustrating process as planners try to coordinate disparate parts of their organizations while trying to strike a balance between how much they *cannot* afford to be unprepared and how much they can afford to spend on resources they may never use. Further complicating matters has been the tendency for organizations to "stovepipe" the different protections relevant to information technology disaster recovery planning. To the extent that COOP planning is carried out by the practitioners of a particular specialty, there is a risk that the resources of that specialty will be preserved while other vital organizational elements could be overlooked. For example, information security has often been handled independently from physical security. In the e-government environment, the heavy reliance on technology systems could produce a plan that is IT-centric, perhaps at the expense of personnel safety. Such an approach is not unique to public sector contingency planning. In the private sector, contingency planners from backgrounds in human resources and staffing are occasionally at odds with specialists in facilities management or information technology regarding which organizational resources ought to receive priority in contingency planning (Blythe, 2003; Canavan, 2004; Seese, 2004), while others argue for a more integrated approach that preserves capacity across the breadth of an organization (Corcoran, 2003). Accordingly, the compartmentalization of an organization's units and processes that Schulz (2001) suggests can contribute to a fractured planning process, leaving a private sector organization vulnerable, likely could apply to e-government assets in the public sector.

## COOP PLANNING AND E-GOVERNMENT

The heavy reliance upon information technology to carry out mission critical tasks and provide other citizen services highlights the need to ensure these assets are protected, backed up, and resilient to any interruption. Moreover, the growth of the use of e-government applications to conduct government-to-citizen interactions, as well as government-to-business and government-to-government transactions, has put additional pressure on the need to reconstitute systems quickly to minimize any disruptions and financial costs associated with a major infrastructure failure (Musich, 2002). To reduce these costs, some public agencies have chosen to develop redundancy of computer or network system components, including hardware, software, and telecommunications links. These resources have been installed and

*Table 2. COOP plan elements and e-government*

In general, viable, robust COOP plans establish the capacity to:

- identify an agency's essential functions and operations that must be supported during, and in the aftermath of an operational interruption;
- reduce loss of life;
- execute, as required, successful succession to office in the event a disruption renders agency leadership unable, unavailable, or incapable of assuming and performing their authorities and responsibilities of office;
- protect essential resources necessary to the operations of an agency. This could include facilities, equipment, vital records, or other assets;
- achieve a timely and orderly recovery from an emergency and reconstitution of normal operations that allows resumption of essential functions for both internal and external clients; and
- ensure and validate COOP readiness through a dynamic, integrated test, training, and exercise program to support the implementation of COOP plans.

are ready to use as a backup in the event primary resources fail. A related aspect of redundancy is the ability to replace or reconstruct hardware and software quickly and easily when necessary to prevent extended periods of downtime. In addition to redundancy, e-government COOP planning entails the establishment of comprehensive data storage plans that include fully and regularly tested backup sites. A comprehensive backup system would likely need to capture more than just an organization's data files. In addition to backing up data, public sector organizations also need to backup the data catalogs, directories, and software applications used with the data. Following the 2001 attacks on New York, organizations that saved only their raw data had to spend a significant amount of time recreating their applications, organizing the data, and reestablishing user permissions to access the data (Garvey, 2001). Taken together, these issues demonstrate the importance of ensuring the reliability and continuity of information technology systems, as part of overall governmental approach to providing reliable e-government as well as assuring domestic security.

At the same time, it should be recognized that e-government programs may not receive the highest priority in contingency planning. Because COOP planning strives to assure the provision of basic services under any circumstance, the elements described in Table 2 that comprise the entirety of COOP planning, may have only a peripheral relationship to e-government contingency planning. For example, while a timely and orderly recovery and resumption of normal operations is the goal of every COOP plan, an e-government presence (Seifert & Petersen, 2002) might not necessarily be designated as an *essential function*, which is generally defined as a service or program that must be available with little or no interruption. Similarly, it is doubtful that e-government managers would be tasked with preventing loss of life or participating in succession planning beyond their organizational unit. Consequently, e-government COOP planning may focus primarily on the maintenance and protection of facilities and electronic records, as well as the resumption of e-government services when higher priority government functions, such as executive leadership, has been reconstituted or civil order reestablished.

## COOP, E-GOVERNMENT, AND THE FUTURE

Future issues related to COOP planning for virtual and bricks and mortar government center around contingency budgeting, issue urgency, and preparedness.

In public agencies the budgetary environment is typically characterized by limited resources. A potential consequence of the acquisition of technology, infrastructure, and supplies to be held in reserve for use in an emergency is the likelihood that such an allocation might reduce resources available for routine operations. To the extent that COOP facilities and infrastructure are integrated into daily agency operations, this matter might be less salient. On the other hand, COOP activities are not always directly addressed in the agency budgeting processes. For example, in the United States, as a consequence of the multidisciplinary nature of COOP planning, federal executive branch agency expenditures for COOP activities are sometimes spread across several departmental or agency accounts, and data are not readily available to demonstrate agency COOP funding levels. Consequently, there is a possibility that budgetary deci-

sions for COOP planning might not cover minimally necessary resources.

As the memory of dramatic disruptions recede from memory, the urgency associated with administrative operations like COOP planning may decline relative to other issues on agency planners' agendas. It is widely held that the success of contingency planning is dependent on regularly updated plans that match current organizational missions and priorities. A further requirement is that an organization's preparedness must be evaluated through regular drills, simulations, or other testing. A reduction in the attention and resources dedicated to COOP planning could have the effect of compromising the utility of such planning. This could result in the loss or compromise of critical agency resources during an operational interruption, and could cause the loss of life of agency personnel or citizens, or the prolonged unavailability of government services and resources through e-government programs.

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## KEY TERMS

**Alternate Database/Records Access:** The safekeeping of vital resources, facilities, and records, and the ability to access such resources in the event that the COOP plan is put into effect.

**Alternate Facilities:** An alternate work site that provides the capability to perform minimum essential department or office functions until normal operations can be resumed.

**Continuity of Government (COG):** Measures taken by a government to continue to perform required functions during and after a severe emergency. COG is a coordinated effort which typically focuses on the protection of elected or appointed national leaders of government in the event of a catastrophic emergency.

**Continuity of Operations (COOP):** An internal effort within individual components of an organization, such as a branch of government, department, agency, or office, to assure that the capability exists to continue essential

operations in response to a comprehensive array of potential operational interruptions.

**Cyber Attack:** An incursion on a range of information technology facilities, which can range from simply penetrating a system and examining it for the challenge, thrill, or interest, to entering a system for revenge, to steal information, cause embarrassment, extort money, cause deliberate localized harm to computers, or damage to a much larger infrastructure, such as telecommunications facilities.

**Essential Functions:** Those functions, stated or implied, that, during an operational interruption, are required to provide essential functions, maintain the safety and well being of the government assets, or citizens.

**Primary Facility:** The site of normal, day-to-day operations; the location where an employee usually goes to work.

**Relocation Site:** The site where all or designated employees will report for work if required to move from the primary facility.

**Stove Pipe:** An organizational model in which departments, managers, and employees have a narrow and rigid set of responsibilities defined by professional or functional norms.

**Training and Exercise:** This activity includes: (1) efforts to educate/advise designated staff on COOP responsibilities, and on the existing plans; and (2) tests to demonstrate the viability and interoperability of all plans supporting COOP requirement.

**Vital Records and Systems:** Records necessary to maintain the continuity of operations during an emergency, to recover full operations following an emergency, and to protect the legal rights and interests of citizens and the government.

# Coordinating Cross-Agency Business Processes

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## INTRODUCTION

A big challenge for governments from all over the world is to improve the service provisioning to their clients, citizens, and businesses. This is partly motivated by the aim to reduce the administrative burdens for citizens and businesses (e.g., Dutch Government, 2003, 2004), but also demanded by its clients, who expect the public sector to increase its attention on customer service just as businesses have done as a result of the rise of Internet technologies (Donnelly, Wisniewski, Dalrymple, & Curry, 1995; McIvor, McHugh, & Cadden, 2002).

Due to the fragmented nature of governments (Wimmer, 2002), the activities that make up the service-delivery processes of many governmental services are often performed by different governmental agencies (Castellano, Pastore, Arcieri, & Summo, 2004; Contenti, Termini, Mecella, & Baldoni, 2003; Gortmaker & Janssen, 2004). Managing these service-delivery processes that span multiple agencies requires adequate coordination between the different subprocesses and different agencies.

The trend of moving toward electronic service delivery makes the need of coordinating cross-agency service-delivery processes even more apparent, as citizens and business expect fast responses and customer-centric service provisioning. A complication is that information systems are also largely fragmented, which gives rise to a whole new range of coordination issues that need to be solved.

A promising technology that offers many advantages to the problem of automating cross-agency processes is Web service orchestration (Gortmaker, Janssen, & Wagenaar, 2004). However, there is a lack of experience reports, literature, and case studies concerning the potential of Web service orchestration (van Hillegersberg, Boeke, & van den Heuvel, 2004). Moreover, orchestration should be viewed on at least two different levels: on a technical, and an organizational level (Gortmaker & Janssen, 2004). On a technical level, Web-service orchestration makes use of the potential of Web-service technology to orchestrate different Web services into one overall service-delivery process. On an organizational level, orchestration can be viewed as performing process orchestrator roles aimed at managing the interdependencies between various subprocesses performed by multiple agencies.

This article investigates research issues concerning the application of Web-service orchestration technology and process orchestrator roles for coordinating cross-agency business processes. These research issues need to be resolved in order to be able to use process orchestrators in an efficient and effective way to coordinate governmental cross-agency service-delivery processes. First, we present the background of both Web-service orchestration and process orchestrators. Thereafter, we investigate a case study and use this case study to demonstrate the research issues that should be addressed for automating cross-agency processes using Web-service orchestration and process orchestrators. Finally, further trends are presented and conclusions are drawn.

## BACKGROUND

### Web-Service Orchestration

Web-service orchestration is based upon the notion of a service-oriented architecture (SOA). Due to its loosely coupled nature, SOA seems very suitable for orchestrating service-delivery processes that run across relatively autonomous agencies (Stojanovic & Dahanayake, 2005). In a SOA, application functionality is not provided by one large monolithic application, but is provided by relatively

small-grained services that are offered by different independent providers. These services can be invoked by service requesters who found the service in a service directory. A SOA makes it possible to quickly assemble new compound services out of existing subservices.

Although various middleware technologies can be used to achieve SOA, Web-service standards satisfy the universal interoperability needs better (Pasley, 2005). Web services are an important technology for realizing a SOA. Web services enable the provisioning of functionality, both on application and business level, by means of a standardized interface in a way that they is easily invoked via Internet protocols. Web services are modular, accessible, well described, implementation independent, and interoperable (Fremantle, Weerawarana, & Khalaf, 2002). Using Web services, existing legacy applications can be reused by encapsulating them using a Web-service interface.

Web-service orchestration coordinates different Web services using an executable business process. As such it builds upon Web-service technology and the concept of a SOA. Wohed, Van der Aalst, Dumas, and Hofstede (2003) define an executable business process as "[specifying] the execution order between a number of constituent activities, the partners involved, the messages exchanged between these partners, and the fault and exception handling mechanisms" (p. 202). In Web-service orchestration, these activities are typically performed by Web services that are invoked from a process by means of their standardized Web-service interface.

The standard language for orchestration is the Business Process Execution Language for Web Services, BPEL4WS, or BPEL for short. A process that is specified in BPEL consists of two types of activities: basic activities, such as receive, reply, wait, and structured activities as switch, while, and sequence. The structured activities determine the structure, or the sequencing of the process, and the basic activities determine what happens in the process, for example, the invocation of a Web service, receiving a message from a Web service, and so forth.

## Process Orchestrator

The process orchestrator aims at coordinating the different subprocesses making up an overall service-delivery process. The process orchestrator is responsible for maintaining an overview about the entire service-delivery process. For this reason, it is obvious to appoint the process orchestrator role to a governmental organization or department, in this way freeing the customers from doing all the coordination themselves.

Although many process orchestrators will make use of information technologies and communication technologies, it should be noted that most process-orchestrator roles are technology independent. A process orchestrator can be compared with other types of intermediaries including information brokers and supply chain managers (e.g., Janssen, 2004). Governmental service-delivery processes that involve other governmental agencies can be viewed as the governmental supply chain.

Tasks that are typically performed by a process orchestrator are the splitting up of a request into several requests for multiple agencies, coordination of various subactivities, guarding lead times of service-delivery processes, facilitating information sharing among agencies, and ensuring accountability of the process, for example, by means of providing, and updating details about the status of the process.

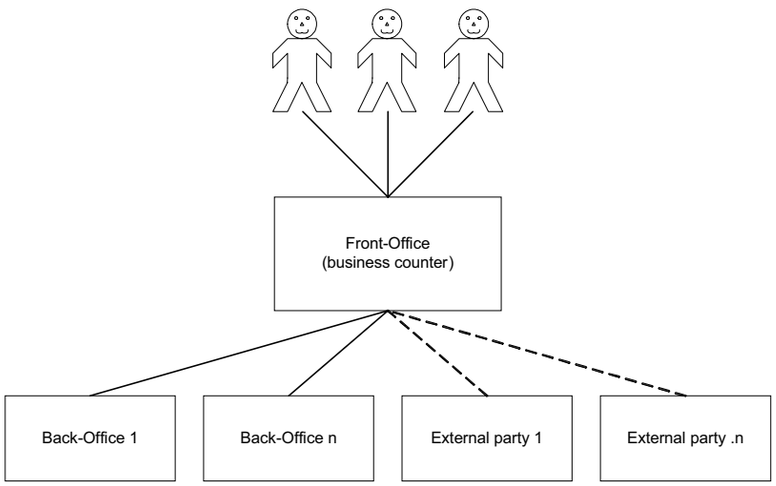
Another major task is providing transaction capabilities. Transaction capabilities are needed when multiple related services are requested in parallel. The use of transactions must ensure that requested services are finalized, or "committed," only when all other services have successfully been delivered. When someone wants to open a new business, he or she needs several permits, such as an environmental permit and a building permit. These permits all require a certain fee to be paid. As there is no use of having an environmental permit for something that cannot be built, these permits should be delivered on an "all or nothing" basis.

A process orchestrator that coordinates cross-agency service-delivery processes can also be viewed as fulfilling certain intermediary roles. Much is written about intermediaries and especially about electronic intermediaries (Bailey & Bakos, 1997; Janssen & Sol, 2000). Bailey and Bakos (1997) make a classification of electronic intermediary roles based on 13 case studies. These roles are (1) information aggregating, (2) being a trusted agent, (3) facilitating the market, and (4) matching buyers and sellers. Although these roles are derived from case studies in the e-commerce domain we also found them useful to analyze the roles performed by a process orchestrator. In the next section, we will investigate these four roles for a case study at a business counter and derive research issues.

# PROCESS ORCHESTRATORS IN PRACTICE

In this section we present a case study of a cross-agency service-delivery process to evaluate the application of BPEL4WS and derive research issues. The business counter is a one-stop shop for different kinds of businesses at a medium-sized municipality in the Netherlands. Throughout the country, this business counter is viewed

*Figure 1. The business counter as process orchestrator*



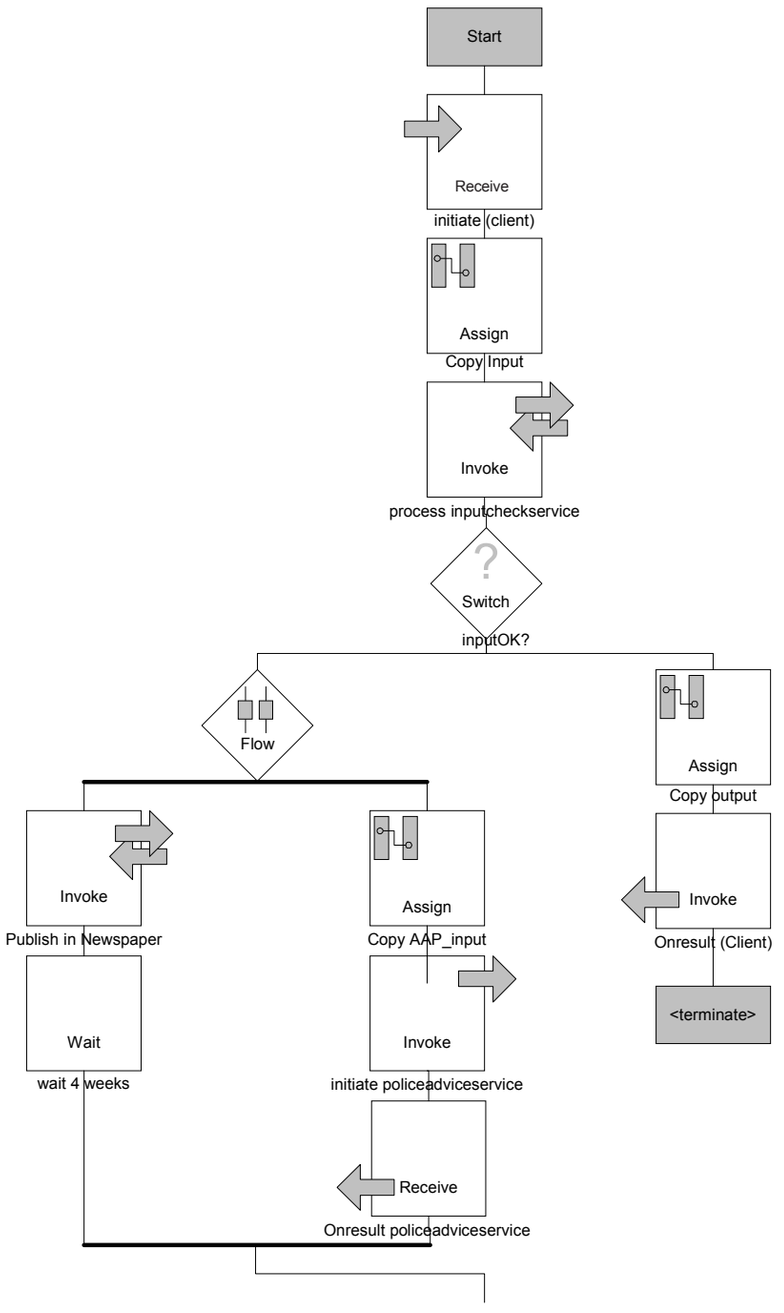

as a best practice due to its organizational arrangement. The business counter coordinates several cross-agency service-delivery processes targeted at local businesses, thereby fitting our definition of the process orchestrator.

An example of a cross-agency service-delivery process that is coordinated by the process orchestrator is the liquor-licensing process. This process involves various governmental and external agencies, such as the building department, the fire department, the police, the justice department, and the chamber of commerce. Figure 2 shows a graphical representation of part of the liquor-licensing process written in the BPEL4WS notation. The process is initiated after an applicant fills in an online application form. First, a Web service to check whether the form is correctly filled in is invoked. When not all fields are correctly filled in, an error message is prompted back to the applicant. When the application is complete, two simultaneous subprocesses are started: the application is published in the municipal newspaper, and a Web service at the police is invoked to obtain information about the criminal record of the applicant.

The business counter performs a number of process-orchestrator roles. Based on the intermediary roles proposed by Bailey and Bakos (1997), we analyzed the roles performed by a process orchestrator.

- **Information Aggregating:** The business counter aggregates information about the services offered by the different agencies. An example in the liquor-licensing process is the aggregation of information from the various agencies, such as constraints on the license from different agencies. This role will become more and more important, as from 2007, governmental agencies in the Netherlands will have to mandatory reuse information about citizens and businesses that is already available somewhere else in the government. Information aggregating can also be viewed from another perspective. Maintaining an overall file of a customer that is available to the relevant officials could also be a great help in increasing the effectiveness of service-delivery processes.
- **Being a Trusted Agent:** The business counter acts as an account manager for the individual businesses, this way being a trusted agent, performing actions on behalf of the businesses. A business should be able to rely on this agent in performing tracking functions and tracing functions, providing accurate status information, and in adequately guarding lead times of the service-delivery processes.
- **Facilitating the Market:** The role of facilitating the cross-agency service-delivery processes is not very obvious at the business counter. In the domain of electronic intermediaries, intermediaries provided facilitating functions such as payment services to its customers. Facilitating functions for governmental service-delivery processes, for example, an authentication service, are provided by agencies other than the business counter.
- **Matching Buyers and Sellers:** concerns the matching of the demands of businesses to the different (sub)services provided by the different governmental agencies. Matching "buyers and sellers" for governmental service-delivery processes be-

*Figure 2. Graphical view of (part of) a liquor-licensing process in BPEL4WS*




comes increasingly difficult, when the services that are needed become less generic and more complex. At the business counter, this matching is done during an initial meeting with the account manager, where the business states its needs and the account manager advises the business about what services are available to fulfill these needs. In the future, matching available services with the demand could even take the form of reverse matching, where the business counter proactively approaches a business telling it that it suspects that the business may also need another permit.

Although the roles do not match completely and other roles might be possible, these roles provide a suitable basis for investigating process orchestrator roles. The case study demonstrates that Web-service orchestration technology using BPEL is a feasible technology that enables the coordination of cross-agency service-delivery processes. Web-service orchestration technology, however, does not solve all problems that arise when automating cross-agency business processes and process orchestrator roles are necessary targeting a number of research issues that will be described in the following section.

## RESEARCH ISSUES

Apart from the further specification and validation of process orchestrator roles, several research issues concerned with automating cross-agency business processes using orchestration were identified using the case study. As the main task of a process orchestrator is to coordinate cross-agency business processes, we limit the issues to those directly related to coordination.

- **Information Sharing:** As can be seen from the analysis of the information aggregating role at the business counter, information sharing between different agencies becomes increasingly important. Different agencies that are involved in a service-delivery process should all have access to the customer data that are relevant to them. Data sharing and integration requires having ontologies describing the semantics (e.g., Linthicum, 2003). These ontologies should be shared and accepted by all autonomous governmental agencies. Web-service orchestration can invoke semantic Web services to make use of semantic technologies. Research should be conducted in how information can be shared between multiple agencies, involved in an orchestrated process, in a way that data is always up to date, that privacy concerns are dealt with (e.g., Ali Eldin & Wagenaar, 2004), and that data are available for enforcement and policy-making purposes.
- **Accountability:** An important requirement for the whole public sector (e.g., Bovens, 2004; Gortmaker, Janssen, & Wagenaar, 2005). Accountability always involves an actor with the duty to render an account and another actor with the power to judge or impose sanctions (White & Hollingsworth, 1999). This can easily be seen from the analysis of the role of being a trusted agent. If the process orchestrator cannot explain the actions or decisions done in the process, it will not be a trusted agent of the client, and the client will most probably resort to contacting the individual agencies himself. Ensuring accountability for governmental service-delivery processes that run across different organizations is especially difficult, as it has to cope with different autonomous agencies that are involved in the process (Ling, 2002). The decision not to grant a liquor license should be transparent and accounted for. Research should be conducted into how governments can ensure accountability of processes that are orchestrated by process orchestrators.
- **Balancing the Needs of the Customers and Agencies:** Balancing the needs of businesses and the supply of services that can be orchestrated by the process orchestrator is difficult. In our case study humans perform the intake with customers. Matching the involved subservices to a simple requested service, such as a request for a liquor license is relatively easy, but highly complex and specific services, such as the governmental services that are needed for moving an existing petrol station to a new location, requires knowledge management. Research should be done on how process orchestrators can use knowledge-based systems to translate customer demand into the services that are supplied by single governmental agencies, and how these can be orchestrated into one overall service-delivery process.

## FUTURE TRENDS

The automation of processes was traditionally the field of workflow management (WfM). In WfM, business processes consist mostly of human-performed activities without using functionality offered by information systems. Nowadays, a shift from WfM toward business process management (BPM) is occurring, where on top of the design, configuration, and enactment of business processes, a module to analyze these processes is also present (Van der Aalst, Hofstede, & Weske, 2003). The paradigms of Web-service technology and BPM merge slowly (Zhao & Cheng, 2005), as a result that BPM systems will become capable of invoking Web services, and Web-service orchestration servers will start offering workflow functionality. It is expected that BPEL implementations will offer more and more advanced workflow capabilities.

We also observe that the enterprise application integration (EAI) market is converging with the workflow/BPM market. This will make the integration and orchestration of business process feasible using standard technol-

ogy. Standardization will especially enable the reuse of complete business processes.

From an organizational point of view, we expect that process orchestrator to become more common in public administration. Moreover, a trend seems to be that process orchestrators will become responsible for the complete end-to-end process and will adopt more roles over time.

## CONCLUSION

Web-service orchestration technology can be used as a technology for improving cross-agency service-delivery processes. As Web-service orchestration technology is rapidly maturing, attention shifts to organizational issues focusing on managing the interdependencies between processes. Consequently, process orchestration should not be mistakenly viewed as synonymous with Web-service orchestration technology.

Coordination of cross-agency processes can be done in a peer-to-peer manner or from the viewpoint of a complete, end-to-end process. Our case study confirmed the premise of this study that a clear allocation of process orchestrator roles taking into account the complete end-to-end process is of crucial importance for the efficient and effective management of cross-agency processes.

Three viable research directions were identified to improve our understanding of process orchestrators. Research should be done in (1) how information can be shared between multiple agencies that are involved in an orchestrated process; (2) how governments can ensure accountability of processes that are orchestrated by process orchestrators; and (3) how process orchestrators can translate customer demand into the services that are supplied by different governmental agencies.

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## KEY TERMS

**Business Process:** A business process is a sequence of tasks, initiated by an event and aimed at providing products or services.

**Coordination of Tasks:** Coordination is the management of dependencies between tasks.

**Process Orchestrator:** A process orchestrator is a role that orchestrates (sub)processes that are performed by different organizations into one overall business process.

**Service-Oriented Architecture (SOA):** A service-oriented architecture is an architectural style, according to which application functionality is not provided by one large monolithic application, but is provided by services that can be combined to get the required functionality.

**Web-Service Choreography:** Web-service choreography defines the sequence and conditions of public message exchanges between multiple Web services.

**Web-Service Orchestration:** Web-service orchestration is the process of invoking internal and external Web services from a predefined process flow that is executed by an orchestration engine.

**Web Services:** Web services is a technology that enables the provisioning of functionality, on an application level or on a business level, by means of a standardized interface in a way that they are easily invoked via Internet protocols.

# The Core Governmental Perspectives of E–Health

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## INTRODUCTION

Public healthcare is facing huge future challenges in order to deal with rising costs, growing demands of customers, information flow, demographic changes, and aging population. The healthcare service sector can be seen as an information intensive area during an era of innovation and information technology (cf. Bellamy & Taylor, 1998). According to McLaughlin, Rosen, Skinner, and Webster (1999), it is common to assume that technological interventions are almost inevitable and it is humans' duty, at least to some extent, to follow the suggested development. In the organizational level of public healthcare, high expectations about the technology and its new possibilities are introduced. Additionally, the customers can seek support and advice for their healthcare needs from thousands online connections at any time of a day (e.g., Silber, 2003). The European Commission (2004) states how "eHealth offers European citizens important opportunities for improved access to better health systems" (p. 22). This trend has implications to human beings and governments.

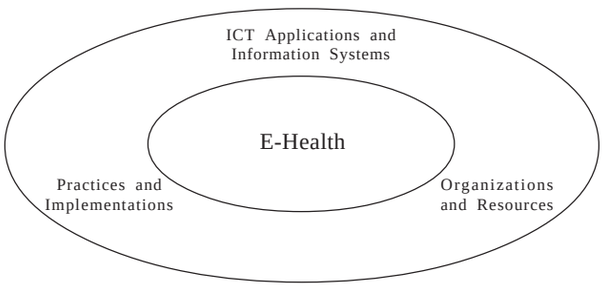
The electronic health services produced by the information and communication technology (ICT) belong to the era of e-government. The e-government can be seen as an electronic exchange of information and services between different actors (cf. Mälkiä, Anttiroiko, & Savolainen, 2004; Oliver & Sanders, 2004). The development of information society throughout the last decades has brought up possibilities to adapt, modify, and reorganize healthcare practices and services (e.g., Gallivan, 2001; Turner, Fraser, Muir Grau, & Toth, 2002). The ICT has been used as a tool to reorganize best organizational practices, information management, and government. The ICT has also given a possibility to produce tailored healthcare services and to gain improvements in cost-effectiveness, access, safety, and quality of public healthcare services (Bates et al., 2001; Whitten et al., 2002).

In the future, the healthcare organizations in public sectors will confront many challenges by means of the ICT implementation. This situation is considered here both as the function of healthcare organizations and as the supply of knowledge intensive public health services. The current viewpoint presumes a paradigm that is structured on the basis of specific conceptualization. The purpose of this article is to conceptualize the complex topic of e-health from the governmental viewpoint and to clarify the best organizational practices. Special notation is also given for human resources, information management and the ICT implementation. Finally, some future trends are shortly discussed.

## BACKGROUND

Experts define e-health differently and the term has some overlapping conceptual views. The term "e-health" is derived from the term "electronic commerce" (i.e., e-commerce), which was introduced in the mid-1990s to reflect the growing commercial use of the Internet. The e-health (cf. Eysenbach, 2001; European Commission, 2004; Silber, 2003), when recognized as a governmental issue, refers to the use of ICT applications or information systems to improve or enable health and healthcare services. Now it also refers to the main organizational and resource based factors before, during, and after an introduction of ICT. Finally, the term refers to best practices and implementations produced or needed to confront and manage with the ICT-based healthcare. The e-health concerns customers, patients, professionals, but additionally the whole primary healthcare, home care, and organizations like hospitals. It engages the terms like telemedicine, telematics, telehealth, medical and health informatics, interactive health communication, and so forth. To conclude, the e-health as a governmental concept give good reason for to describe the abovementioned combination by the means of three conceptual dimensions.

*Figure 1. E-health concept according to the core governmental dimensions*




## CONCEPTUAL DIMENSIONS OF THE E-HEALTH PARADIGM: THE GOVERNMENTAL PERSPECTIVE

In the first dimension, the e-health connection can be found by referring to ICT applications and information systems in healthcare and in supporting functions (cf. McGinnis, 1997; Turban, McLean, & Wetherbe, 1999). In many cases, this has included telemedicine and health informatics as patients have been informed, examined and treated over distance by using appropriate applications (e.g., Hailey, Roine, & Ohinmaa, 2002). The e-health is seen now through issues like information system, standardization, and system quality (e.g., digital referrals, data security, access, and privacy, etc.). Also, the usability or user-friendly orientation should be placed under a close scrutiny. Hence, the applications and systems require understanding about technology and its effect on organizational structures, processes, and actors.

Secondly, it is considered that by e-health it is possible to renew and to produce more effective healthcare practices and implementations. Now the e-health is studied typically in conjunction with key processes like the management of ICT applications and information (Plsek & Wilson, 2001; Tachakra, El Habashy, & Dawood, 2001; Walker & Whetton, 2002) and by the means of best practices or ICT implementations in healthcare (e.g., Paré & Elam, 1999). The introduction of technology may support or change operational practices in organizations. The operational aspect engages also electronic healthcare services as the e-health services are multileveled. Services represent, for example, the possibility of consumers to interact online, the possibilities for institution-to-institution data transmissions, and the possibilities for peer-to-peer communication of consumers. However, the overall question is about the best practices and implementations in order to successfully complete the e-health in service sector.

As third dimension, the organization and its various resources (e.g., economical and humanistic) have been under intensive study. For example, Parente and Dunbar (2001) found that hospitals with integrated information systems have higher total and operating financial margins than those without these systems. Whitten et al. (2002) did a systematic review and found no good evidence that telemedicine is cost-effective. Additionally, the e-health can be seen in terms of human resources. This is the case, for example, with the acceptance of ICT-based organizational solutions (Mathieson, Peacock, & Chin, 2001) and with the professional human resources (e.g., Syväjärvi, Stenvall, Harisalo, & Jurvansuu, 2005). The interest has also been in health services and in policy to provide a diverse range of services (e.g., Silber, 2003; Turner et al., 2002). Both customers and professionals can be seen as key actors, because they use applications and participate in electronic service interaction (e.g., Hailey et al., 2002).

Hence, the e-health from governmental perspective can be defined as health service and information delivered through different technologies. Applications of the ICT and information systems support health, healthcare, and health services. In case of current governmental perspective, the dimension of ICT applications and information systems concentrates mainly on technological system, standardization, and usability issues. The ICT applications can be seen as architectures to understand and plan information system components in the form of an organizational infrastructure. The most crucial questions are the standardization of information systems and their usability in organizational environment.

It seems worldwide that open technical standards to provide e-health are lacking. McGinnis (1997) studied health informatics and stated the critical importance of data exchange standards for communication between healthcare providers. The usability instead is traditionally defined (cf. Isomäki, 2002) by attributes like learnability, efficiency, memorability, errors and satisfaction. However, without neglecting the human factors like learning, sensation, and perception, memory, problem solving, and so forth. An optimal system should be easy to learn, it should be efficient to use, the system should be easy to remember, the error rate with the system should be low, and the system should be pleasant to use. Corresponding arguments of usability and human-centered design are also offered by ISO quality standards.

Second governmental dimension of e-health was about practices and implementations. E-health as practices and implementations emphasizes the need to combine knowledge and the use of ICT in various ways. In this article, the management as an organizational process has the viewpoint of ICT-based e-health. McLaughlin et al. (1999)

claimed that in hospitals it is needed a wider perspective than social, since managers and users need to have a commitment to longtime innovative process. Clark (1995) suggested that leaders have the main responsibility for development work, because the problem with technological changes was frequently that people and technology didn't meet or people didn't participate.

The management has also direct link to best practices in organization and its health service production. Martin (2000) claimed that the quality of public services and cost-effectiveness depend on management. Smith (2004) studied how to inspire and motive professional service teams and indicated the importance of discussion and collective responsibility. The e-health can be seen as a part of knowledge intensive public services in a knowledge intensive society. The previous conceptualization invoked to describe the current e-health practices and implementations more generally as seminal goals for public healthcare organizations. However, it should be reminded that information technology does not necessarily lead so radical organizational changes as expected (Bellamy & Taylor, 1998; Nicholson, 2003).

The third governmental dimension of e-health involved organizations and resources. The governments try to manage with the increasing costs of public administration. Simultaneously the need to improve the cost-effectiveness of public healthcare has become apparent. One way to resolve the dilemma has been the use of electronic health services. However, the results have been controversial. Whitten et al. (2002) made a massive evaluation and they included 24 of 612 identified articles presenting cost-benefit information. About 30% of those 24 tried to solve the economic function of telemedicine without a clear outcome.

However, in public organizations the ICT has had often a transformative role. The e-health is understood and projected as being able to reshape the way healthcare services are delivered. The demands set by stakeholders are obvious. Governments want accountability to ensure that the funds are used effectively. Healthcare providers want a better quality of work life through the ICT tools. Patients and customers want access to the high quality healthcare service. One response has been the virtual life of organizations (cf. Nicholson, 2003). The virtual life in current context can be defined as a group of people or organizations that interact through interdependent task guided by common good purpose. In addition, the actors have learned to interact across space, time and inter-professional or organizational boundaries by using the ICT-based e-health solutions (Syväjärvi et al., 2005).

## ORGANIZATIONS AND E-HEALTH: IMPLEMENTATION AND HUMAN RESOURCES AS CRUCIAL FACTORS

Numerous organizational e-health projects with various goals are ongoing worldwide under public administration. For example, the European Commission launched an Action Plan for a European eHealth area in 2004. The aim is to support EU member states to materialize the benefits available from e-health, and to respond to the growing need for coordinated activities of e-health (European Commission, 2004). These kinds of activities denote a coherent agenda for the implementation of e-health. Hence, the e-health implementation may cause changes in organizational design and such changes typically require new organizational structures, processes, and personnel arrangements. From governmental perspective, the e-health either allows or forces an organization to rearrange especially its human resources. The focus is thus to analyze the relationship between e-health implementation and HR-centered organizational practice. Human resources are considered as a key area of e-health implementation.

Human resources have indeed an essential function both in knowledge intensive healthcare practices and in knowledge innovative services. The implementation of e-health has indeed organizational effects as it should concurrently support the patient mobility, facilitate the citizen-centered healthcare, but particularly to provide healthcare professionals new tools to sustain or improve the quality of public healthcare service. The implementation should allow greater flexibility, for example in case of inter-professional and organizational practices, to enhance information and knowledge exchange between humans. It is given here a synopsis of e-health implementation that contains previous governmental dimensions.

Many nations worldwide are known as countries with high technology. The extensive use of ICT and the adoption of various technological solutions represent everyday practice. In these knowledge intensive nations, the public policy has been largely based on the assumption that society will develop and succeed by focusing on ICT. For example in many European countries the information technology has been harnessed to promote social welfare. The ICT has been used for strengthening and developing the welfare society. The public service organizations and citizens thus have confronted the wave of e-government (e.g., Mälkiä et al., 2004; Oliver & Sanders, 2004). At the same time research has concentrated on the possibilities, quality, and costs of technology. However, what the implemented information technology means to public health service sector,

public organizations, and especially to organizational human resources has usually received less attention. Under the issues of e-government and public services, there are several approaches to the human-centered e-health implementation.

Firstly, from the point of how the employees' attitudes and approval affect the success of implementation (Mathieson et al., 2001). This kind of approach has produced theoretical models to explain how implementation depends on reasoned action of humans and the technology acceptance. Considering a more professional view, for example, the doctors who have received training in technology and understand technological concepts are more likely to grasp the positive impact of technology in healthcare (Paré & Elam, 1999). Burge, Creps, and Wright (2001) assumed that doctors are key persons to adopt technology in healthcare organizations, however, the doctors are not enthusiastically accepting the technology if it does not help everyday work. Tachakra et al. (2001) suggest that telemedicine includes the ability to rearrange the distribution of work; especially concerning the tasks of doctors and nurses. The ICT-based e-health seems not to be a question of single profession as it reflects over entire professional work society.

Secondly, the ICT has been studied by the innovative theories. Again models have been presented how a technological innovation is adopted in an organization through various phases. Gallivan (2001) developed a frame of references how to merge a technical innovation into the organizational operation. Thus, there are themes like management support, high resources, organization culture, own responsibility of learning, broad work roles, work security, and individual characteristics, which either increase or decrease the innovative implementation. These studies argue that the success of information technology in organizations more generally reflects the systems of innovations' advance in organizations. Finally, as technology is implemented to organization more clear and exact strategies accompanied with leading spokesmen are required (Walker & Whetton, 2002).

Thirdly, the setup "e-health vs. implementation" stimulates the leadership and management dimensions. Clark (1995) suggests that the use of ICT is an organizational issue that needs efforts in the direction of change. The leaders have thus a responsibility to create and sustain participation, but also trust (cf. Harisalo & Stenvall, 2004). In good accordance, Plsek and Wilson (2001) found complexity in leadership and management of healthcare organizations. They assumed that leaders should found ways to make the change more attractive and meaningful for workers. This is done by securing the open information flow of good practices. The earlier observation about the complexity of knowledge intensive health services denotes the importance of information management. The information management refers to interdisciplinary procedures designed to provide and improve the appropriate information systems and resources by planning, organizing, executing, and evaluating necessary management operations. Thus, the human resource perspective both involves multi-professional diversity practices and presupposes the proper activities of human resource management (Syväjärvi et al., 2005).

Fourthly, the human resource centered ICT implementation considers the development of information systems according to usability factors, organizational practice, and the humanization of computerized information systems (Cummings & Worley, 2001; Isomäki, 2002). The usability of information systems is included in this framework. The information system development (ISD) can be introduced by different phases. It is stressed that the ISD tasks must be completed with knowledge concerning users and contextual analyses. Isomäki (2002) found that only a few information system designers have potential to contribute to the humanization of information systems. Cummings and Worley (2001) considered organizational change as a function of implementation process. They indicated how implementation causes organizational change and this can be controlled throughout singular phases like by information or system contracting and gathering, familiarizing, planning and accomplishing, evaluating and stabilizing. The humanization and e-health-based information system development can be seen as a part of organizational development (OD). Organization development in public health service sector applies this kind of knowledge and practice in order to help organizations to achieve effectiveness and social quality of work life.

The fifth and final aspect to comprise human resource and e-health implementation consists of the cognitive human capacity and service administration. The human capacity indicates the multilevel competencies of professionals. The service administration indicates both the service knowledge and management, which are approached in a customer-centered way. The e-health services are a challenge for both individuals and collective work society. Hence, individual, collective, and organizational competencies (e.g., Hamel & Prahalad, 1994; McLagan, 1997) are clearly required in different phases of the implementation. These competencies represent the foundation of service knowledge, which denotes the ability to arrange and manage both professionally and organizationally with the electronic public services. In present context this entirety (i.e., professional and organizational practices), the e-health implementation and customer relationships can be supported by appropriate and flexible service management. The public service management can comprise, for example, the dimensions of project management, human resource management, network management and

customer relationship management. The concept of service management can be also seen as one value creator for service innovations or improvements, and with modifications, as a suitable management approach for organizations from various sectors (cf. Boyne, Martin, & Walker, 2004; Fitzsimmons & Fitzsimmons, 2004; Martin, 2000).

## FUTURE TRENDS

In the near future organizations will once again face a dynamic and turbulent environment. That requires flexible and fast response ability from the healthcare organizations and public services. The ongoing era of e-government has enabled organizations to acquire such structures and processes that support new or additional ways of interaction between electronic service providers and customers. Hence, the future trends of e-health indicate implications for health service users, service suppliers and entire society. The purpose of this section is to discuss shortly some essential future trends of e-health. The future possibilities and needs of e-health are introduced according to present literature and reflected alongside the three main dimensions described in current conceptualization. Thus, the final section is based on future prospects and e-health's relationship to e-government.

The present view indicated that the public healt care services will be going through major electronic turnarounds. The e-health revolution accompanied with the future possibilities are far away from straightforward. Many different issues have to be considered in order to make successful ICT-based transitions in public services. In case of organizations and resources there is going to be a further increase in information intensity of the e-health. Public institutions and human actors are stressed and challenged over again with more sophisticated, and hopefully with more user-friendly and appropriate information technology. There will be a need for competent health professional as continuous cognitive pressure is evident. A clear e-health challenge for public healthcare organizations seems to be how to manage with differences in processes, with strong professional culture of healthcare personnel, with cognitive pressure set by ICT, and with hierarchical or traditional structures.

These prospects as seen as future trends of e-health indicate cooperation, but also knowledge and information integration both in organizational and professional level. For example, healthcare professional will probably have fast and unhindered access to the latest knowledge and to the other relevant information needed in clinical practice. It is also assumed that the number of virtual organizations and new innovative services will be increased. The organizational and resource-based future of e-health has to be affected more by customers and patients. The e-health services are targeted as support for the customers (i.e., for those who daily cope with individual health). Thus, as the impact of ICT on healthcare professionals is extensive, similarly the e-health should be harmonized to the specific needs of the users. For example, citizens will increasingly have an opportunity to access their own health data and to contact directly to health professional (e.g., online booking, e-prescribing, home-care monitoring, health information bank, etc.). It is expected that the customer-centered approach will be even more vital as a resource for the future development of e-health. In knowledge intensive society, more demanding customers can be recognized.

In the future, the applications appear to be even more plentiful for consultations with other organizations, professionals, and patients. Portable and mobile tools will be increasingly adopted in healthcare settings together with many web-based gateways or portals. For example, the question can be about the new innovative e-health systems for retrieval, feedback, participation, clinical data management, and in general about the electronic health recording systems (EHR). There will be quite many views about the needs of e-health-based information systems and probably only a few will get it right. The challenge will be the standardization of ICT applications and information systems. Also the users themselves should be equal partners in development teams. As indicated before, people will probably found themselves in the era of virtual life. This indicates the increasing use of collaboration-support information systems.

Finally, the e-health future has implication in the dimension of practices and implementations. The ICT can be seen as a powerful change agent for the whole healthcare sector and it is important to recognize the importance of non-ICT factors in e-health. In this sense, alongside the system implementation it seems to be significant to concentrate on workplace practices and implementations. The best practices and implementations will be valued even more in the complex future of e-health. The e-health interventions based on ICT re-engineering, human-centered information systems, human resource and change management, and practical work innovations will play crucial roles for wellness in workplaces.

It seems that practical work tools or models that support decision making, management, preparation and processes will have an enormous importance. Public healthcare organizations will continue to invest huge amounts of resources into the latest ICT. It seems that new investments on organizational practices and implementations should support both professionals and customers. For example, one challenge is to combine multi-professional practices and service security for the customers benefit. During the continuing era of e-government, the e-

health concept will be even more inevitable and natural part of the public healthcare service.

## CONCLUSION

The current governmental perspective of e-health has focused into three core dimensions. Current conceptualization has indeed some overlapping areas, but it is important that the approach to e-health is not done only by means of ICT factors or some single science. Hence, the e-health should follow the multi-scientific paradigm as the concept itself has been adopted by the experts of medicine, health science, applied information technology, social science, information and communication science, and by governmental and management science.

It was found how rich the topic of e-health is. The e-health was studied through the ICT implementation and human resources in the knowledge intensive healthcare service organizations. Hence, the implementation of e-health was recognized as a function of various practices and human resources together with future organizational possibilities in public service sector. Alongside the implementation procedures, the human resource was found to be fundamental. Thus, professional, inter-professional and customer perspectives were critical factors. Current perspectives go under the e-government. It combines the perspectives of governmental and management science, social science, health science, and applied information technology. The future trends of e-health thus involve various combined implications to customers and professionals, to service and system suppliers, and to organizations.

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## KEY TERMS

**E-Government:** An electronic exchange of information and services between different actors. Usually refers to local or state government activities that take place by digital processes and various networks.

**E-Health:** Health services and information delivered through different technologies in order to improve or enable health, healthcare and services with variable contents and transactions (cf. Eysenbach, 2001).

**E-Health Usability:** The design and technical features that allow electronic healthcare applications and information systems to be suitable for intentional use in a user friendly way.

**Health Informatics:** Knowledge, skills, and tools to support the delivery of healthcare information and services (cf. Silber, 2003).

**Health Information System:** An ICT-based routine constructed for the purposes of delivering health and medical care. Information system can be seen as physical process that supports an organization by providing information to achieve goals.

**Information Management:** Interdisciplinary procedures designed to provide and improve appropriate information systems and resources. Refer to planning, organizing, executing, and evaluating the necessary management operations.

**Standardization of E-Health:** The method to reduce or eliminate inconsistency, potential added costs and quality problems in applications and information systems of the electronic healthcare.

# Corruption, Transparency, and E-Government

C

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## INTRODUCTION

Regarded from a historical perspective, the appearance of corruption is not a new phenomenon at all. It can be traced back to the ancient civilizations of China, Egypt, Greece, India, Israel, and Rome, which all provide evidence of widespread illegality and corruption. In spite of its long history, corruption increasingly became a political issue in the 1990s: corruption scandals contributed substantially to the resignation of governments in Ecuador, Brazil, India, and Italy and unsettled well-established ruling parties in Japan and Mexico (Lash, 2004; Sen, 1999).

According to Sen (1999), "the prevalence of corruption is rightly regarded as one of the major stumbling blocks in the path to successful economic progress, for example in many Asian and African countries" (p. 275). Dudley (2000) estimates that 30% of the money spent annually for international development loans are diverted from productive pursuits because of corruption. Additionally, countries perceived as being corrupt suffer from lower (private) capital inflows, as foreign investors are deterred by corruption and its associated phenomena, which include bureaucratic red tape, mismanagement and the lack of secure property rights (Transparency International (TI), 2004). Overall, the cost of corruption represents 5% of the volume of total global output or more than 1.5 trillion dollars a year according to "rough, but conservative" World Bank estimates (United Nations, 2003c). Table 1 aims to illustrate the scale of political corruption by presenting estimates of the funds allegedly embezzled by 10 notorious (but not necessarily the most corrupt) leaders of the last 20 years.

## BACKGROUND

Taking into consideration the historical record as well as the increasing public awareness of corruption, it seems to

*Table 1. The scale of the problem (Hodess, 2004, p. 13)*

| *Head of government* | | *Estimates of funds allegedly embezzled* | *GDP per capita (2001)* |
|---|---|---|---|
| Mohamed Suharto | President of Indonesia, 1967-98 | USD 15 to 35 billion | USD 695 |
| Ferdinand Marcos | President of Philippines, 1972-86 | USD 5 to 10 billion | USD 912 |
| Mobutu Sese Seko | President of Zaire, 1965-97 | USD 5 billion | USD 99 |
| Sani Abacha | President of Nigeria, 1993-98 | USD 2 to 5 billion | USD 319 |
| Slobodan Milosevic | President of Serbia/Yugoslavia, 1989-2000 | USD 1 billion | n/a |
| Jean-Claude Duvalier | President of Haiti, 1971-86 | USD 300 to 800 million | USD 460 |
| Alberto Fujimori | President of Peru, 1990-2000 | USD 600 million | USD 2,051 |
| Pavlo Lazarenko | Prime Minister of Ukraine, 1996-97 | USD 114 to 200 million | USD 766 |
| Arnoldo Alemán | President of Nicaragua, 1997-2002 | USD 100 million | USD 490 |
| Joseph Estrada | President of Phillipines, 1998-2001 | USD 78 to 80 million | USD 912 |
| (...) | | | |

be worthwhile to take a closer look at its underlying concept. Literally, the notion of corruption may be employed in several ways; It may refer (1) to the impairment of integrity, virtue, or moral principle in the sense of depravity, (2) to decomposition and decay, (3) to the inducement to wrong by improper or unlawful means, or (4) to the departure from the original or from what is pure or correct (Merriam-Webster Online Dictionary, n.d.). Thus, the term "corruption" is first and foremost marked by its normative nature referring to the departure from some ideal state of purity or rightness (Bukovansky, 2002). Applied in a political context, corruption therefore implicitly incorporates an underlying notion of the original or natural state of government run altruistically by politicians and civil servants in pursuit of the public good.

Hence, political corruption arises whenever civil servants or politicians depart from the "pure" state of politics by violating established rules for personal profit and thus causing damage to the public good (Sen, 1999). In its most common term, corruption in the public sector is therefore defined as the abuse of entrusted power by public officials as well as politicians for private gain (Lash, 2004; Hodess, 2004, Lambsdorff, 2001). As this article discusses the contribution of e-government to the promotion of transparency and combating the misuse of public power, the term "corruption" is deployed in the following in compliance with the common understanding of its political occurrence.

Regarding the phenomenon of corruption from a systematic perspective, incentives for corrupt behaviour arise whenever a politician or a public official is vested with the discretionary power to allocate government services, on which he or she usually has a monopoly, to the private sector. Hence, Klitgaard (1997) regards corruption being equal to monopoly power plus discretion minus accountability (in short: C = M + D – A). Based on this equation, the fight against corruption involves the improvement of both, the political as well as the public administrative system, towards reduced (or at least regulated) monopoly power, clarified official discretion, and enhanced accountability.

In this regard, transparency may serve as a catalyst for better systems, since it reduces discretionary power and promotes a government's (and its administration's) accountability. The promotion of transparency, therefore, is a key element in preventing and also fighting corruption, financial irresponsibility, and underhand dealings (Seifert & Bonham, 2003; Sen, 1999; United Nations (UN), 2003a). According to the "United Nations Convention against Corruption" (UN, 2003b), transparency has to be developed based on an all-encompassing approach: Member states are urged to determine transparency as the guiding principle for the recruitment, hiring, retention, promotion and retirement of civil servants and other non-elected public officials as well as for the funding of candidatures for elected public office and the funding of political parties in general. Systems of public procurement and the management of public finances have to be based on transparency and accountability. Overall, each state should "enhance transparency in its public administration, including with regard to its organisation, functioning, and decision-making processes, where appropriate" (UN, 2003b, p. 7).

## E-GOVERNMENT vs. CORRUPTION

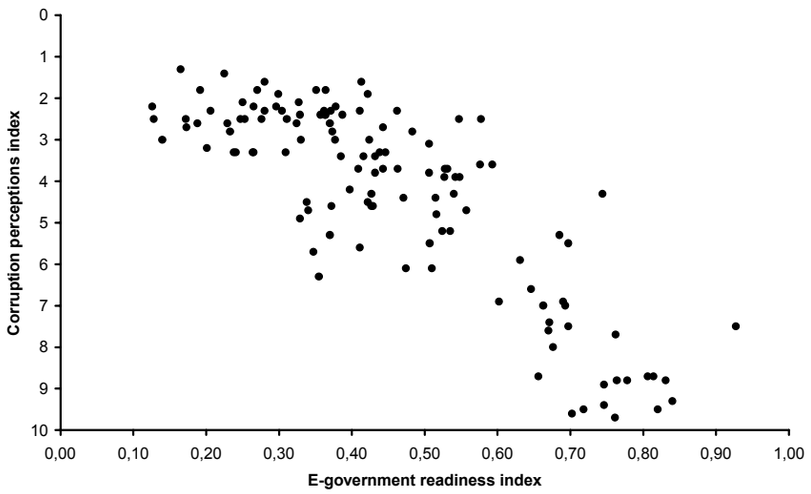
### Evidence (?)

Apart from the ordinary range of e-government's benefits, which has been discussed extensively in literature, increasing focus has been given lately on e-government as a tool to fight corruption (Bhatnagar, 2003). Regarded from a conceptual point of view, the application of information and communication technology (ICT) in public administrations can potentially reduce corruption by enforcing rules, diminishing the discretion of public officials and increasing transparency and social control (Scacco, 2003; UN, 2001; Wescott, 2003).

Figure 1 provides some evidence for the suggested interrelationship between the state of e-government development and corruption: It shows a strong positive relationship (with a correlation coefficient of 0.828) between the e-government readiness index (0=no e-government readiness, 1=sophisticated e-government readiness) and the corruption perceptions index (0=very corrupt, 10=highly clean) for the 123 nations covered by both rankings.

The e-government readiness index, which was collected and published within the framework of the UN global e-government report in 2003, assesses the capacity of the public sector of UN member states to use ICT for encapsulating in public services and deploying to the public high quality information and effective communication tools in a quantitative way. It is a composite index comprising the Web measure index (measuring the generic aptitude of governments to employ e-government as a tool to inform, interact, transact and network based on a five stage-framework distinguishing between emerging, enhanced, interactive, transactional, and networked presence), the telecommunication infrastructure index (the composite weighted average of (PCs, internet users, telephone lines, online population, mobile phones, and televisions)/1,000 persons) and the human development index (a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio with two thirds of the weight given to the first

*Figure 1. Corruption and e-government readiness 2003 (Lambsdorff, 2004 [for corruption perceptions index]; UN, 2003a [for e-government readiness index])*




*Note: Due to the inverse nature of the corruption perceptions index the values on the y-axis are presented in reverse order. A higher scoring in the corruption perceptions framework indicates a lower level of corruption and vice versa.*

indicator and one third to the latter) with one third of the weight allocated to each parameter (UN, 2003a).

Transparency International's corruption perceptions index has been published annually since 1995 and "aggregates the perceptions of well-informed people with regard to the extent of corruption, defined as the misuse of public power for private benefit" (Lambsdorff, 2004a, p. 282). In the 2003 measurement, 133 nations are included. Methodologically, the corruption perceptions index is a composite index based on 17 data sources from 13 different institutions (World Economic Forum, Institute of Management Development, Economist Intelligence Unit, Information International, World Markets Research Centre, Gallup International, Freedom House's Nations in Transit, PricewaterhouseCoopers, Political and Economic Risk Consultancy, World Business Environment Survey of the World Bank, Columbia University, Business Environment and Enterprise Performance Survey of the EBRD, and the World Bank, and a multilateral development bank). All sources provide a ranking of nations and measure the overall level of corruption; after having been standardised, the corruption perceptions index is derived from these data sources (Lambsdorff, 2003).

Having outlined the underlying concept of the corruption perceptions index it should be stressed again, that the index provides a snapshot of the views of decision makers. Thus, one main criticism made of the corruption perceptions index is that it (as any other perceptions index in general) does not replicate the actual situation in a country (Zoido & Chavis, 2004). On the other hand, Lambsdorff (2003) argues that the perceptions gathered are a helpful contribution to the understanding of real levels of corruption. Biased perceptions, which cause a wrong picture of the real phenomenon, can be ruled out because of evidence given that "residents tend to have a consistent ethical standard with regard to the assessment of corruption, while expatriates do not tend to impose an inappropriate standard or to lack cultural insights" (Lambsdorff, 2003, p. 6).

Having presented statistical evidence for the suggested interrelationship between the state of e-government development and the degree of corruption, it seems to be worthwhile to scrutinize whether this relationship is as straightforward as it might appear at first sight. For illustration purposes, a third variable–namely the annual gross domestic product, which is expected to correlate with both corruption as well as e-government–is integrated into the examination of mutual correlations.

First, a high degree of corruption is referred to as a characteristic of developing countries in economic literature (Krugman & Obstfeld, 2000). In fact, correlating the annual per-capita gross domestic product (GDP) (purchasing power parity USD) and the corruption perceptions index shows an even stronger positive relationship between the two indicators than between e-government development and corruption: Using the sample of

123 nations outlined above, the correlation coefficient between the 2002 GDP per capita in real terms (Source: UN, 2004) and the corruption perceptions index (Source: Lambsdorff, 2004a) reaches the value of 0.903. (In the case of Luxemburg's GDP per capita—and in accordance with the United Nations' calculation of the human development index—a value of $40,000 was deployed instead of the published value of $61,190, as the GPD per capita of Luxembourg tends to be overestimated due to the large share of cross-border workers in total employment.)

Several factors featuring different cause-and-effect assumptions underlie this strong positive relationship: First, governmental and administrative systems that promote corruption are suggested to harm economic development as well as prosperity. Second, corruption itself appears to have a net negative economic efficiency and growth. Third, less developed and hence poor nations lack the funds to fight corruption effectively and, finally, poverty itself generates a greater willingness to break existing rules and regulations. As the suggested effects of these factors demonstrate, it is not acceptable to presume any kind of (single) causality between GDP per capita and corruption (Krugman & Obstfeld, 2000; Lambsdorff, 1999, 2005).

Second, the state of e-government development is highly correlated to GDP per capita (Lanvin, 2003; Schware & Deane, 2003) too, resulting in a correlation coefficient of 0.867 for the 123 nations covered, which is again higher than the one generated by correlating corruption and e-government development. (As outlined above, Luxembourg's per-capita GDP was again set at $40,000).

As is true for the correlation between GDP and corruption, the factors underlying the relationship between GDP and e-government development also appear to have effects working in different directions: On the one hand, countries with greater wealth are able to allocate more resources to the development of e-government. According to West's (2004) findings GDP per capita is "the most significant predictor of online services" (p.21). On the other, the United Nations (2003a) regard e-government as a facilitator for socio-economic development, as the proper use of information technology "offers an immense potential to bridge inter- and intra-state socio-economic disparities, reduce poverty and further the goals of development worldwide" (p. 182).

Summing up, the state of economic development (measured by GDP per capita) could be identified as a parameter related to both the extent of corruption as well as e-government readiness. However, no causalities can be derived from these relationships, and it seems likely that other parameters such as democratic culture or civil liberties show effects on the development of e-government and corruption in one direction or another. Widening the originally illustrated relationship between the e-government readiness index and the corruption perceptions index by bringing in a new variable, namely GPD per capita, should therefore demonstrate that increased sophistication of e-governments need not lead to reduced corruption and vice versa.

## Structural Requirements

Having rejected the assumption of a mono-causal relationship between e-government and corruption (i.e., the notion that the implementation of e-government leads to reduced corruption automatically), the question has to be raised, whether—and if so, under which circumstances—the introduction and extension of e-government can contribute to combating corruption.

In a meta-survey on empirical investigations on the consequences and causes of corruption, Lambsdorff (2005) concluded "that corruption clearly goes along with a low GDP, inequality of income, inflation, increased crime, policy distortions, and lack of competition. The direction of causality for these indicators, however, is controversial. Corruption may cause these variables but is at the same time likely to be the consequence as well" (p. 26).

Yet, Lambsdorff (2005) could identify strong evidence that corruption reduces a nation's attractiveness to investors and hence reduces capital accumulation as well as capital inflows and productivity of capital. Moreover, distorted government expenditure and reduced quality of a wide variety of government services could be identified as further consequences of corruption supported by equally strong evidence.

As far as the causes of corruption were concerned, "press freedom and the (de facto) independence of the judiciary and prosecutors appeared to be important elements in reducing corruption. Increased corruption also resulted from complicated regulation of market entry and tariffs" (Lambsdorff, 2005, p. 26). Abundance of natural resources, distance to trading centres and cultural dimensions (in particular the mentality of accepting hierarchies) were found to lead to increased corruption too. However, the latter three factors were not suggested to provide any direction of reform.

Taking into consideration these causes of corruption from a governmental point of view, four indicators favouring the absence of corruption can be derived: law and order, bureaucratic quality, government stability and civil liberties (Lambsdorff, 2004b). Consequently, if trying to judge the contribution of e-government to fighting corruption, it has to be analyzed, which of these four indicators can be addressed by integrating ICT into governance and respective administrative processes.

As documented widely in academic and non-academic literature, e-government incorporates the potential to raise the quality of bureaucratic processes as well as of the relationships between administrations and citizens or administrations and businesses (e.g., Rohleder & Jupp, 2004; United Nations, 2003a). In this context, it appears important to keep in mind that complete automation does not represent a necessary precondition to nurture these potential benefits: In Chile, for instance, procurement announcements are published on a Web site, whereas the core bidding process remains a manual one. Nevertheless, Chile has succeeded in accumulating savings due to expanded supplier choice and enhanced transparency in supplier selection and has hence managed to improve government effectiveness in this certain area (Bathnagar, 2004).

As far as law and order and civil liberties are concerned, these two factors can theoretically be classified as pushing factors to the establishment and development of e-government systems (Moon, Welsh, & Wong, 2005). Thus, these governance indicators do not represent a consequence of national e-government efforts. Instead, the prerequisite nature of a sound legal system based on accepted institutions and a high level of civil liberties to e-government development can be demonstrated by presuming the absence of these values: Without the rule of law applied in public governance, administrative operations are prone to arbitrary actions which cannot be integrated into any ICT-supported system. The absence of freedom of speech, democracy and other civil liberties is regarded as another major stumbling block to e-government: As long as authoritarian or even dictatorial regimes regard their individual citizens as mere subjects, the development e-government applications is likely to be suppressed, as e-government involves citizen participation as well servicing individuals according to their needs (United Nations, 2003a).

Stability of government is also suggested to have an impact on e-government, albeit a weak one. Regarded as a precondition to e-government, the implementation of the latter is expected to result in less friction under a stable government. On the other hand, increased bureaucratic quality due to e-government could be considered as a factor promoting government stability.

Summing up, e-government applications show the potential to increase bureaucratic quality and thus favour the absence of corruption, whereas law and order as well as civil liberties represent prerequisites to their development. Consequently, if endeavouring to implement e-government initiatives in order to enhance transparency and fight corruption effectively, the latter two conditions have to be restored as e-government can only address the bureaucratic factor directly.

## Intentional Design

Having identified structural requirements for realizing the corruption-fighting potential of e-government, the question has to raised, how e-government application should be designed on a micro level in order to enhance governmental transparency. According to Bhatnagar (2003), the decline of corruption opportunities has often been an incidental benefit rather than an explicit intention of e-government initiatives so far. In order to reduce the amount of corruption effectively by the use of e-government applications "some features that lead to greater transparency and accountability need to be consciously built into the design" (Bhatnagar, 2003, p. 25). These features, again, should be geared towards the following three objectives from a conceptual point of view:

First, e-government applications must increase access to information: E-government can only lead to enhanced transparency, if the overall national legislation supports free access to information on the one hand whilst respecting privacy and security issues on the other. In order to reduce discretion by ensuring that relevant information can be retrieved by as many citizens as possible, applications have to be designed in accordance with existing ICT infrastructure and—where appropriate–resort to multiple information channels (e.g., in countries with low internet and high TV penetration, public TV stations could provide information on new legislation via teletext services). In case of inadequate infrastructure the implementation of e-government initiatives has to incorporate the establishment of communication channels as well (see Box 1 for the setup of professionally operated internet kiosks in India). Also, e-government services should be promoted effectively in order to increase their utilization and consequently enhance governmental transparency (Bhatnagar, 2003; United Nations, 2003a).

Second, e-government services must ensure that underlying rules are transparent and applied consistently in specific decisions: The development of an online service delivery system involves the standardisation of administrative rules and procedures in order to enable computer coding. Publishing rules, regulations and requirements for government services online again enhances transparency and reduces the opportunity for arbitrary action available to civil servants when servicing citizens on a case-by-case basis (Bhatnagar, 2003; Center for Democracy and Technology (CDT), 2002). Furthermore, if citizens are offered relevant legislation and online tools, such as, for instance, tax calculators (e.g., withholding calculator, US Internal Revenue Service or individual non-business calculator, Australian Taxation Office) or immigration application tests (e.g., skilled worker self-assess-

ment, Citizenship and Immigration Canada), they can anticipate the presumable outcome and no longer have to take the outcome of the administrative process for granted without any means to re-check. So, e-government services based on transparent rules show the potential to encourage citizens to "question unreasonable procedures and their arbitrary application" (Bhatnagar, 2003, p. 30).

Third, e-government applications must build the ability to trace back decisions and actions to individual civil servants: As outlined above standardized administrative procedures work as a first means to reduce arbitrary action of civil servants. However, by building track-and-trace mechanisms into electronic services the chance of exposure of corrupt practices is enhanced. The fear of consequent embarrassment may therefore serve as a barrier to corruption for the individual civil servant. Moreover, the ability to track the status of their applications emboldens citizens to take specific counteractions in case of excessive delays (CDT, 2002; United Nations, 2003a).

According to Bhatnagar (2003) corruption can be reduced significantly if all three objectives are borne in mind when designing e-government applications. Conversely, ignoring some of these features may lead to ineffective e-government in terms of combating corrupt behaviour: A government Web site focusing solely on the provision of electronic access to information does not ensure enhanced accountability and transparency with regard to service delivery processes. A successful example of the use of e-government as a means to fight corruption, in which all the features outlined above have been integrated, is presented in Box 1.

## FUTURE TRENDS

After having diffused globally in a haphazard manner with not much regard given to costs as well as realized benefits, e-government currently seems to be maturing (Bannister, 2004; Moon et al., 2005). Governments are becoming increasingly reluctant to invest public funding into the development of e-government systems without a detailed estimation of the expected benefits of these initiatives. Consequently, researchers as well as IT consultants are eager to develop more sophisticated models and frameworks of e-government development, taking into consideration not only the amount of online services but also structural and social prerequisites, as well as effects and benefits (e.g., Kunstelj & Vintar, 2004; Moon et al., 2005; Rohleder & Jupp, 2004; United Nations, 2003a).

Referring to application of e-government systems as a means to fighting corruption and enhancing transparency, benefit has rather been incidental so far (Bhatnagar, 2003). Along with the tendency to develop and implement e-government systems based on multi-faceted frameworks, one might well expect that the design of e-governments will be customized in mutual relationship with structural prerequisites in order to perform certain functions.

However, future research is still needed on the relationship between corruption and transparency on the one hand and e-government systems on the other, as the latter can only be a part of the solution resting upon other governmental and societal systems at work. The current presentation and (sometimes superficial) analysis of success stories demonstrating the anti-corruption potential

*Box 1. Computerisation of land records, Karnataka, India (Bhatnagar, 2003, p. 26)*

> The Bhoomi ("land") project of online delivery of land records in Karnataka, one of India's 26 states, demonstrates the benefits of making government records more open so as to enable citizens to challenge arbitrary bureaucratic action. It also illustrates how automation can be used to remove discretion from civil servants.
>
> The department of revenue in Karnataka has computerised 20 million records of land ownership for 6.7 million farmers in the state. Under the manual, paper-based system, 9,000 village accountants maintained land records. Farmers had to seek out the village accountant to obtain a copy of their "Record of Rights, Tenancy and Crops" (RTC)–a document essential for obtaining bank loans. Village accountants were not easily accessible. The time taken to provide RTCs ranged from three to 30 days, depending upon the importance of the record to the farmer and, therefore, the size of the bribe. A typical bribe could range from INR 100 to 2,000 (USD 2 to 40).
>
> All "mutation requests"—requests to alter land records upon sale or inheritance of a piece of land—had to be filed with the village accountant, who was required to issue notices to the interested parties and post the information at the village office. Often neither of these actions was carried out and no record maintained. If no objections were forthcoming within a 30-day period, an update of the land records was to be carried out by a revenue inspector, a practice that could take up to two years.
>
> The Bhoomi initiative reduced the discretion of public officials by introducing provisions for recording mutation requests online. Farmers can now access the database and obtain a printed copy of the RTC online at 180 computerised kiosks for a fee of INR 15 (less than USD 1). A farmer can check the status of his application on a touch screen provided on a pilot basis in three of the computerised kiosks. Operators of the computerised system are made accountable for their decisions and actions by the use of a system that authenticates every log-in through a thumbprint. In the next phase of the project, all the databases will be uploaded to a central, Web-enabled database. RTCs will then be available online at Internet kiosks, which are planned for rural areas. (…)

of e-government (e.g., Bhatnagar, 2003; Scacco, 2003) do represent an anxious first step. In spite of this, the very implementation and functioning of e-government systems cannot be regarded as being isolated from consequences and causes of corruption (Lambsdorff, 2005). In order to provide a concise framework from which steps to be taken can be derived, future research should focus upon the development of a contingent, multidimensional approach including e-government as one means to reduce corruption under certain preconditions.

## CONCLUSION

Even though it is frequently assumed that the use of e-government applications reduces opportunities for corrupt behaviour, reality seems to be more complex: According to Bhatnagar (2003) "e-government offers a partial solution to the multifaceted problem of corruption" (p. 30) in a way that it may lead to reduced discretion and arbitrary action on the one hand and increased transparency and accountability on the other. However, features combating corruption have to be consciously build into the design of e-government applications on a micro level. On a macro level, such e-government initiatives have to be part of broader political and public sector reforms striving for the establishment or consolidation of law and order as well as civil fundamental freedoms (i.e., freedom of opinion, freedom of press, freedom of assembly, freedom of association, freedom of religion…) in order to enable public control of all fragments of the public as well as political sphere.

Relating to the micro level of e-government applications and its essential features to be integrated in order to combat corruption effectively, the United Nations' global e-government survey (UN, 2003a) found that 90% of its member states with official Web presence provide texts of laws and policies on their Web sites. However, only 36% offer substantive service information, which appears to be a prerequisite to transparent rules. In the case of track-and- trace mechanisms, merely 19% of the countries with official Web sites provide online transactions and have thus established the basic infrastructure necessary for the implementation of such mechanisms.

Whether e-government will be used as a tool to create transparency and hence fight corruption on a large scale is finally a question of political will. However, if politicians commit themselves to do so, future e-government applications will feature transparent rules and track-and-trace mechanisms on the one hand and will be embedded in broader political and public sector reforms on the other in order to maximise its corruption-combating potential.

Overall, it seems important to emphasise again that e-government should not be seen as a solution combating corruption in itself, but as a means to initiate and support broader public sector reforms (Bhatnagar & Deane, 2004; Scacco, 2003; Wescott, 2003). It must be kept in mind that "technology is an important facilitator, but it cannot produce results on its own" (Scacco, 2003, p. 29).

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## KEY TERMS

**Accountability:** The responsibility to someone or for some action. Used in a political context, it refers to the trait of being answerable to the electorate for political or administrative actions and represents an important factor in securing good governance. In contrast to transparency, it enables feedback after an action.

**Correlation Coefficient:** A measure indicating the degree of linear dependence between two random variables. It can vary from -1 (perfect negative correlation) through 0 (no correlation) to +1 (perfect positive correlation).

**Corruption:** The violation of established rules for personal profit. Corruption is most commonly deployed in a public sector context, in which it refers to the misuse of entrusted power by politicians and public officials for private gain.

**Gross Domestic Product:** The total value of all goods and services produced within a territory during a specified period (usually per year). GDP differs from gross national product in excluding inter-country income transfers, in effect attributing to a territory the product generated within it rather than the incomes received in it. When comparing GDPs internationally two methods can be used: the current exchange rate method (GDP calculated by exchange rates prevailing on international currency markets) or the purchasing power parity method (GDP calculated by purchasing power parity of each currency relative to a selected standard).

**Purchasing Power Parity:** A method used to calculate exchange rates between the currencies of different countries. Purchasing power parity exchange rates calculate the relative value of currencies based on what those currencies will buy in their nation of origin.

**Track-and-Trace Mechanism(s):** They were first developed and applied by private postal and parcel services and enabled clients to track and trace their shipments all over the world. Applied in an e-government context, track-and-trace mechanisms enable the individual to check the processing status of his or her enquiry as well as the actions set by officials throughout the process.

**Transparency:** In physical sciences, a physical object is said to be transparent if one can see through it (at least partially). In social sciences, transparency refers to the opposite of privacy; an action or social phenomenon is said to be transparent if all the information about it is freely available. It enables feedback before or during an action.

# Courts on the Web in Russia

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## INTRODUCTION

When the Internet reached Russia in the mid-1990s, Russian judicial chiefs actively embraced the idea of having a solid presence of national judiciary on the Web. To judges, having court Web sites would improve public awareness about Russian courts and relieve overloaded court clerks from answering mundane questions about the location of courthouses, hours of work, schedule of hearings, court forms, and so on. However, the chronic underfinancing of Russian courts in the 1990s and the decentralized nature of the Russian judiciary made the creation and the maintenance of the lower courts' Web sites much more sporadic.

Improving public awareness about Russian courts is a priority for Russian judges, who increasingly issue impartial decisions yet at the same time face growing public skepticism about judicial performance (Solomon, 2003, 2004; Trochev, 2006). As the growing number of studies of the information and communication technologies (ICT) in courthouses around the world show, computerized courts can both speed up the administration of justice and strengthen public trust in the judicial system (Bueno, Ribeiro, & Hoeschl, 2003; Dalal, 2005; Fabri & Contini, 2001; Fabri & Langbroek, 2000; Fabri, Jean, Langbroek, & Pauliat, 2005; Langbroek & Fabri, 2004; Oskamp, Lodder, & Apistola, 2004; Valentini, 2003; Malik, 2002). Indeed, as the recent research demonstrates, those who know something about the courts: either about court procedures or about court-ordered public policies, tend to trust the judiciary and to comply with court decisions (Baird, 2001; Gibson, Caldeira., & Baird, 1998; Kritzer & Voelker, 1998; Tyler & Mitchell, 1994; Tyler, Boeckmann, Smith, & Huo, 1997).

This article focuses on the Web sites of Russian courts as the virtual gateways in the world of judicial administration (Trochev, 2002) and discusses challenges of adapting Russian court Web sites to the needs of various users of judicial system: judges themselves, law-enforcement agencies, actual litigants, general public and scholars (Toharia, 2003).

## BACKGROUND: INFORMATION AND COMMUNICATION TECHNOLOGIES IN RUSSIAN COURTS

Following the collapse of the USSR in 1991, Russia's constitution-makers pursued a major program of judicial reform, as they understood that strong and independent courts would help to achieve larger policy goals (Solomon & Foglesong, 2000). In theory, Russia's rulers needed a respected rule of law system and effective courts to attract significant investment for the Russian economy and carry out further reforms on such crucial matters as land ownership (Trochev & Solomon, 2005). With the accession the Council of Europe and acceptance of the binding jurisdiction of the European Court of Human Rights (ECHR) in 1998, Russia has also been facing an additional challenge of administering justice in a timely and fair manner in order to avoid violation of the Article 6 of the European Convention on Human Rights. Since the early 1990s, Russian judges insisted that meeting these challenges and improving the efficiency of their courts in the context of exploding rates of litigation would be impossible without computers and information and communication technologies (ICT) in every courthouse. As Solomon and Foglesong (2000) report, by early 1998, the Russian Supreme Court had plans for a comprehensive publication of its judgments (p. 105), while the Russian Constitutional Court and the Higher Arbitrazh Court had their Web sites up and running even before that. However, the Russian government took this idea seriously only in 2001, when the first ECHR judgments against Russia severely criticized the country's inefficient and slow administration of justice. If in 2001, there were 10,000 computers in all Russian courts, by early 2005, their number grew to 40,000. Starting in 2004, the Russian judiciary annually receives additional 500 million rubles (17 mln U.S. dollars) to buy computers, servers, and modems, to create and maintain electronic data interchange (EDI), network management, court intranets/extranets, videoconferencing, and court Web sites. As a result of this massive funding, by the end of 2005, Russia's 118 commercial (arbitrazh) courts be-

came ready for the integration into a country-wide intercourt network that will serve as a basis for the electronic paperless resolution of commercial disputes. International financial aid and technical assistance has also played an important role in digitizing the Russian judiciary. In fact, Russian government officials encouraged judges to apply for grants from foreign NGOs (Trochev & Solomon, 2005). However, domestic funding and the willingness of court chairs to use information technologies remain crucial determinants of getting Russian courts ready to meet the challenges of the 21st century.

## Russian Constitutional Courts on the Web

Russian Constitutional Court (RCC) has its own Web site, www.ksrf.ru, containing all decisions on the merits of the case and some rulings dismissing the case. Some rulings are published only on the Web site of the Court and are enforceable. In addition to the jurisprudence of the RCC, this Web site contains the schedule of the upcoming hearings, statistical data about the work of the Court, speeches by the chief justice, biographies of justices and historical essay about the Court. Unfortunately, this Web site no longer posts summaries of several RCC decisions translated into in English, French, and German. All RCC Justices and some Court clerks have an access to the Internet. This is in addition to the RCC intranet with an easy access to all judgments of the Court as well as several legal databases. This intranet was made available through German funding in the mid-1990s.

Three out of fifteen regional constitutional/charter courts also have presence on the Internet (Trochev, 2004). Karelia Constitutional Court, www.gov.karelia.ru/Law/index.html, has a regularly updated Web site with decisions, by-laws of the Court and short biographies of Justices. For the text of dissenting opinions, you need to search at the Web site of "Karelia," the official newspaper of this region, www.gov.karelia.ru/gov/Karelia/search.html. Sverdlovsk Oblast Charter Court, ustavsud.ur.ru/1.htm, has similar detailed information on Justices and their work. This court has also several publications by the Justices as well as data on the implementation of the Court's decisions in 2000. St. Petersburg Charter Court, ustavsud.spb.ru/content.asp?cnt=114, is also present on the Web thanks to the efforts of the St. Petersburg State University law school students. This Web site contains fewer court decisions and only few lines on the judges' background. But it has the texts of journal and newspaper articles about the Court's work.

## Russian Ordinary Courts on the Web

Unlike federal and regional constitutional courts, Russia's ordinary courts form a hierarchy with the Russian Supreme Court (RSC) at its apex. The Web page of the RSC, www.supcourt.ru, has information about the Court's work and its history, a collection of judgments, and a schedule of its hearings. In addition, the RSC Web site contains data about the work of the Russian judicial self-government bodies: the Council of Russian Judges, the Congress of Judges, and the Higher Judicial Qualification Collegium, the main body in charge of screening judicial nominees and disciplining judges. Here, one could also find the electronic copy of the monthly RSC Bulletin, an official publication of the Court, which frequently contains important guidelines for lower courts.

Lower ordinary courts are the courts that most Russians are familiar with. There are about 2,500 municipal/rural courts, 87 regional courts and 146 military courts. The Web page of the St. Petersburg courts, www.cdept.spb.ru, lists the contact information for all ordinary courts in Russia. The Web site of the Russian Judicial Department, www.cdep.ru, has up-to-date statistics about their workload. While by early 2004, every regional court had an access to the World Wide Web, the RSC Web site contained links only to a dozen of regional courts including two military courts. This delayed production of the court Web sites reflects the decentralized nature of the Russian judiciary: many regional court chairs have very few incentives to promote their courts on the Web and prefer to spend resources on other priorities of judicial administration. This is why the majority of the regional courts' Web sites simply list addresses, working hours and contact information of these courts and the Justices of the Peace.

Websites of other courts have more usable information for judges, mass media, and the public. Court Web sites in Yaroslavl, oblsud.yar.ru and cdyar.yaroslavl.ru, and in Saratov, www.usdsaratov.ru, regions, target primarily local judges. They publish summaries of cases, numerous interviews with local judges and reports about the judicial reform in the regions. The Web site of Cheliabinsk Regional Court, www.ural-chel.ru/gubern/obl_sud/index.htm, which is famous for its televised cassation criminal trials contains materials on the ICT to support judicial administration. Briansk Regional Court's Web site, www.debryansk.ru/~suddepbr, is also devoted to this issue as well as to the work of the justices of the peace. The Web site of Omsk Regional Court, www.oblsud.omsk.ru, has statistics on the cases heard in 2001 and early 2002, monthly schedule of civil and criminal

cases, and review of publications about the Court in local media. Judges in Khabarovsk Region regularly contribute to the monthly "Justice" newspaper and quarterly Bulletin on Judicial Practice, both of which appear at the regional court Website, www.usd.khv.ru. Kaluga ordinary courts, www.suddep.kaluga.ru, publish downloadable templates of complaints, claims, and civil actions of various categories to assist potential litigants in filing their lawsuits. Municipal courts in oil-rich regions already have functioning Web sites. Usinsk City Court in Komi Region, www.usinsk.com/sud, and Muravlenko City Court in Iamal-Nenets Region, gorsud.muravlenko.com, provide claim forms and contact information for judges, the Bar, the procuracy and the court bailiffs on their Web sites. Noiabrsk City Court in Iamal-Nenets Region, posts weekly updated schedule of hearings and hosts interactive "Frequently Asked Questions" section on its Web site, ngcourt.nojabrsk.ru.

Finally, there is a small minority of Russian courts that follow the example of the Russian Supreme Court and publish their judgments on the Internet. For example, Karelia Regional Court, versud.karelia.ru, and Amur Regional Court, www.oblsud.tsl.ru, have published a selection of their judgments on the Internet. Most valuable and regularly updated Website, www.scourt.vens.ru, is hosted by Ul'ianovsk Regional Court which has a wealth of information on this court's jurisprudence, judicial reform, etc. It even has the minutes of the meeting of the regional conference of Judges. Sverdlovsk Regional Court, www.femida.e-burg.ru, also publishes its judgments on the Web and even has lively interactive "questions & answers" section, where Internet users can receive brief answers from regional judges.

Military courts in Moscow and St. Petersburg have also been particularly active in creating and updating their presence on the Web. Moscow District Military Court, www.movs.ru, has a selection of its judgments issued in 2002. Leningrad District Military Court, www.dk.ru/voensud/INDEXX.HTM, has a database of its decisions issued in 1999 to mid-2001 and a short essay on the history of military courts. The Web sites of St. Petersburg Garrison Military Court, gvs.spb.ru, and Pushkin Garrison Military Court, pgvs.spb.ru, have their judgments, claim forms and even addresses and telephone numbers of local jails and prisons, where the accused or convicted soldiers and officers are likely to be held. Pskov Garrison Military Court, www.psc.ru/voensud, also posts certain decisions issued in 2000 and templates for filing complaints.

Among city courts, Moscow District court in the city of Tver' offers the most informative and up-to-date homepage, www.mossud.tver.ru, with all court decisions since 2000 and templates of complaints, claims and civil actions of various categories. This is the only local court that publishes its own decisions thanks to the generous funding by the Open Society Institute.

## Russian Arbitrazh Courts on the Web

The arbitrazh courts, established in 1991 to hear disputes among firms and between firms and the government, exist at the trial level in 87 regions, 20 appellate circuits of three to five regions (introduced in 2003), 10 cassation circuits of eight to ten regions (added in 1995), and the Higher Arbitrazh Court. The Higher Arbitrazh Court maintains a Web site, www.arbitr.ru, with extensive database of its decisions, the contact information, including e-mail addresses, of all lower arbitrazh courts, archive of publications about them and statistical data on the work of these courts in 1992-2004. Similar to the limited Web presence of ordinary courts, although all arbitrazh courts have Internet access, only few of them have Web sites online. Some courts, like North Ossetiia Arbitrazh Court, as.alanianet.ru, publish only a selection of their judgments and fail to update their Web sites on a regular basis. Omsk Arbitrazh Court, www.omskarbitr.ru, posts a daily schedule of its casework and texts of decisions issued in October-November 2001 and April-May 2002. One judge of this court has his own Web site, chucha.omskarbitr.ru, with several publications and court decisions. The Web site of Primor Arbitrazh Court, primarbitr.ru, has numerous reviews about the Court's jurisprudence, together with an interactive "questions & answers" section, where Internet users can receive brief answers from regional judges. Northwestern Circuit Arbitrazh Court in St. Petersburg, www.fas.spb.ru, has a wealth of data on the work of this court including helpful information for the litigants. This court posts its own quarterly journal "Arbitration Disputes" on the Web at www.kadis.net/asp/asp_view.php3, which you can read after registering free of charge. Moscow City Arbitrazh Court, www.msk.arbitr.ru, boasts a database of about 4,000 decisions issued in 1991-2005, statistical data on the Court's work since 1998, contact information and claim forms. East Siberian Circuit Arbitrazh Court in Irkutsk, fasvso.ru, in addition to various useful court-related information, publishes its quarterly journal "Justice in Eastern Siberia" on the Internet, www.pravosib.ru, featuring arbitrazh court judgments, case comments and interviews with Siberian judges.

# FUTURE TRENDS

In addition to ICTs, the use of Internet among Russian courts is likely to continue if only to ease the burden of

an overloaded judiciary and to improve its reputation at home and abroad. Both tasks are daunting in light of Russia's vast landmass, frequently changing legislation, and widespread public perception of the judicial dependence and corruption. Given the level of current funding, all Russian judges and court clerks will have computers and access to the World Wide Web in the next decade. More and more court Web sites will contain court judgments, particularly in the light of the recent guidelines on court Web sites issued by the Russian Supreme Court and the Higher Arbitrazh Court. Given that, as of mid-2005, each appellate court in Russia has a full-time press-attaché, court Web pages are likely to present interviews with judges and court officials about their achievements and challenges. Judges in post-authoritarian societies must advertise their work: if judges fail to inform the citizens, nobody else will. Greater interaction with journalists as well as with the public via Internet is bound to make the Russian court more user-friendly and more up-to-date. Fortunately, many recent judicial appointments in Russia indicate that the newly appointed court chairs are willing to use ICT, including Internet, in their courts. Finally, greater integration of Russia into the global market place through its imminent accession to the World Trade Organization may provide an impetus for the Russian judiciary to have English-language versions of their Web sites. Indeed, the experiences of post-communist countries (Latvia, Lithuania, and Estonia), which recently joined the European Union, show that deeper international integration contributes to more English-language content of court Web sites.

## CONCLUSION

If designed and maintained properly, court Web sites could greatly improve the administration of justice and the image of judiciary in the eyes of the public. On the one hand, publishing court decisions on the Web is an attractive way to tell the public about the work of the high courts. Electronic dissemination of court decisions to the mass media improves the interaction between the judiciary and the press. Having a court Web site also signals judges from abroad that the Russian judiciary is well equipped to navigate the information super-highway. On the other hand, easy access to judicial decisions on court Web sites places a great responsibility on judges to deliver sound and persuasive verdicts (preferably with the summaries to be easily understood by ordinary citizens). Also, court Web pages must contain up-to-date and accurate information on the site for viewers to use while preventing unauthorized users from accessing confidential data. Finally, court Web sites must enhance the accessibility of the judiciary and cater to the needs of actual and potential litigants. Some Russian judges have already realized this. The Web sites of military courts post claim forms so that soldiers can simply print them out, fill in the blanks, and file a lawsuits. City courts post on the Web contact information of local lawyers and human rights non-governmental organizations, law enforcement agencies and court bailiffs, to whom local residents could turn for help. Other courts answer questions posted on their Web sites by concerned citizens. Sharing these Web-based innovations with other courts would be the next step in the right direction. Moreover, learning from the experiences of foreign (British, Finnish, Canadian, and some state courts in the USA) would be very important for Russian court Webmasters. Still, more research is needed to determine the needs of the users of these court Web sites so that the growing presence of the Russian judiciary on the WWW actually improves the public reputation of the third branch of Russian government.

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## KEY TERMS

**Council of Europe:** An international organization founded in 1949, currently consists of 46 member states, which accept the principle of the rule of law and guarantee basic human rights and freedoms to their citizens.

**Electronic Data Interchange:** The computer-to-computer interchange of strictly formatted messages that represent documents, like court conviction records, court orders and judgments, claim forms and legal acts.

**European Court of Human Rights:** A judicial branch of the Council of Europe, which was created in 1959 to hear human rights complaints from Council of Europe member states, and to issue decisions binding on the member states.

**Extranet:** A system for communication among two or more computers, used a group of select users, like judges and court clerks across the country (and excluding everyone else).

**Information and Communications Technologies (ICTs):** Technologies from computing, electronics, and telecommunications to process and distribute information in digital and other forms, like radio, television, phones, computer and network hardware and software, satellite systems, and so on.

**Intranet:** A system for communication among two or more computers, used internally in an organization.

**Network Management:** maintenance of two or more computer systems linked together by telephone lines, cables, or radio waves.

**Russian Judicial System:** Consists of the federal and regional constitutional courts; the ordinary courts including military courts and justice of the peace courts, in charge of civil, administrative, and criminal cases; and commercial (arbitrazh) courts.

# Current Approaches to Federal E-Government in the United States

C

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## INTRODUCTION

The U.S. government is making strides to provide electronic access to government agencies and services. A variety of issues are involved when implementing e-government programs such as electronic tax filing, access to drug information, and so forth. Financial, technical, personnel, and legal issues are common. Privacy issues in the creation of e-government are also of interest to both the e-government implementer and citizen. There are a variety of issues in planning and implementing projects of the scope and magnitude of e-government. Issues such as user requirements, organizational change, government regulations, and politics, as well as descriptions of planning and implementation frameworks, are important. Experience in developed countries shows that it is not difficult for people to imagine a situation where all interaction can be done 24 hours each day, 7 days each week.

Many countries, including the United States, France, Australia, Greece, Canada, Singapore, and Italy have been offering government services online (West, 2004). According to Sharma and Gupta (2003), Canada, Singapore, and the United States are categorized as "innovative leaders" (p. 34) whose continued leadership in the creation of e-government and more mature online services sets them apart from other countries. Canada leads the way in e-government innovation while Singapore, the United States, Australia, Denmark, the United Kingdom, Finland, Germany, and Ireland are countries in the top-10 list. Several Asian countries such as China, Hong Kong, India, Japan, Philippines, Indonesia, Thailand, Bangladesh, and Burma have initiated the concept of e-government as well (Dodgson, 2001).

An article in *Federal Computer Week* (Perera, 2004) reported findings of a recent poll indicating that 77% of Internet users (or some 97 million people) in the United States have gone online for government information. E-government is rapidly becoming a key priority of the government of the United States.

## OVERVIEW OF E-GOVERNMENT

E-government refers to the delivery of national or local government information and services via the Internet or other digital means (Galindo, 2004; Sharma & Gupta, 2003). E-government is the process of transacting governmental business with the public through the use of automated systems and the Internet network. Another way to look at e-government is to see it as an online government service. The purpose of e-government is to provide an e-portal: "a one-stop Internet gateway" (p. 35) to major government services by the streamlining, simplification, and integration of services of various government agencies (Sharma & Gupta, 2003).

One of the key potential benefits of e-government is the enhancement of citizens' access to government information and services, as well as increased citizen participation in the democratic process (e.g., e-voting). Government's customers are increasingly more demanding, and a survey of federal chief information officers found 86% believing that e-government improved service delivery and 63% feeling it reduced costs (McNeil, Tolbert, Mossberger, & Dotterweich, 2003).

The most widely used application of e-government is the publication of information for citizens on the Internet. One challenge to achieving more robust usage is to create an interactive, real-time government service vs. the present static environment. A few governments have Web enabled their transactional systems to allow their constituents to conduct business over the Internet (West, 2004). However, the majority of these systems is limited to a single agency and is not fully integrated with all the governmental structures. The National Science Foundation (NSF) has attempted to address the challenge of helping government agencies adopt concepts derived from basic research and adapt them to the practical problems of government work (Marchionini, Samet, & Brandt, 2003). The NSF Digital Government Program strongly supports research into the development of e-government.

Fountain (2001) states that IT changes the capacity and control features of traditional bureaucracies. Power can be redistributed as well as functional responsibilities within and across federal agencies. This change can affect how the public sector ultimately functions.

## HISTORY OF E-GOVERNMENT

A June 2000 initiative from President Clinton created an integrated online service system that placed federal-government online resources on a single Web site (http://www.firstgov.gov). This administration promoted the idea of "reinventing government"to improve government efficiency and citizen participation (Osborne & Gaebler, 1992, p. 60). This initiative attempted to build one-stop access with $500 billion in U.S. government funding, with $300 billion going to grants and $200 billion to procurement opportunities. Following this federal initiative, many local governments adopted IT for various aspects of local governance.

The E-Government Act was signed by President Bush in December 2002. The purpose of this bill was to increase public access to governmental information. This law requires the federal government to use Internet-based information technology to enhance citizen access to government information. The new Office of Electronic Government within the Office of Management and Budget (OMB) was created in response to the act to encourage the government to make its Web sites more user friendly (GAO, 2004; Tillman, 2003). This office will focus on capital planning and investment control for IT, information security, information privacy, and the access to and preservation of government information (OECD, 2003). The e-government office oversees the development of an integrated Internet-based information system for each federal agency while establishing government-wide policies to support IT standards. Interagency committees are also set up and periodic reports with recommendations are recorded (GAO).

The E-Government Act created two programs: (a) the Federal Information Technology Workforce and (b) the Federal Information Security Incident Center (Tillman, 2003). The former program's initiative requires the Office of Personnel Management (OPM) to assess the government's IT personnel needs. The OMB manages the Federal Information Security Incident Center, which maintains a list of information security incidents and informs the agencies of potential security threats and vulnerabilities.

E-government activities are financed by an e-government fund. The General Service Administration (GSA) manages the fund, which will support OMB-approved e-government projects. Executive Order 13011 created the Chief Information Council in 1996 to develop recommendations on federal information-management policies. Individual federal agencies must develop a set of e-government performance measures dependant on their customer-service record, productivity, and use of innovative technology. Each agency also needs to provide the public with consolidated access to government information and services through an integrated Internet-based portal (OECD, 2003).

The E-Government Act also requires the government to be more accountable. The bill requires every regulatory agency to establish a Web site to collect and post public comments on every rule it considers. The Food and Drug Administration (FDA) has a Web site that establishes public comment periods and considers public opinions before a law is promulgated (Center for Food Safety and Applied Nutrition, 2003). The public now has access to a database of the voting records of Congressional members and the independent analysis of bills from the Congressional Research Service (Tillman, 2003).

Information security is also an important goal of this new legislation (Miller, 2002). National security and law enforcement groups coordinate the management of threats to federal IT with private-sector organizations. Each agency is accountable in preventing unauthorized access to their information systems. Independent auditing is also part of the process.

E-government services used most frequently are filing personal income-tax returns, applying for a state fishing or hunting license, renewing professional licenses, submitting employment information, registering a complaint against a business or a professional licensee, renewing a driver's license, and requesting a government loan. E-learning also provides training opportunities for federal agencies (Welber, 2001). A strategy developed by Health and Human Services (HHS) personnel and IBM uses a portal on the Internet outside the HHS firewall that allows employees access to it at anytime, anywhere.

## ISSUES IN PLANNING

Implementing an e-government framework is a challenging task. Unless careful preparations are made, e-government is not likely to succeed. According to Sharma and Gupta (2003), there are several key recommendations for the planning stage. Creating e-governance awareness is essential at the initial stage. A massive campaign should be conducted to raise the awareness of e-government services and try to build commitment for e-governance. Workshops, programs, seminars, conferences, Web-based documentation, or individual meetings are part of this

campaign, as well as obtaining awareness and commitment from senior officials.

E-governance requires a variety of legislative changes that include the recognition of electronic documents in courts of law, electronic signatures, electronic archiving, data matching, the freedom of information, data protection, computer crime, and intellectual property-rights legislation. Regulatory changes are required for a range of activities that include procurement to service delivery (Thompson, 2003). All changes would form part of a broader change to support generic e-economy and e-nation initiatives.

The e-government framework can be implemented successfully if personnel are available who could assume the role of developers as well as end users. It is vital to establish an effective critical mass of manpower, knowledge, and skills sufficient to support an e-governance strategy. Technical knowledge could be obtained through education at universities, training programs, and special workshops.

Strong technology infrastructures are also an important consideration in the planning process. Effective telecommunication infrastructures facilitate the delivery of e-government services. Countries that have telecommunications infrastructure controlled by government may need deregulation to establish a viable communication infrastructure and competition to decrease prices. The costs of obtaining Internet access (including the hardware) are often too high for many countries.

The goal of e-democracy is to deploy information technology to increase the effectiveness and efficiency of democracy. Another study led by Watson and Mundy (2001) presents a three-phase, dual-pronged strategy for implementing e-democracy: initiation, infusion, and customization. The initiation stage creates the infrastructure (software firms, methodologies, and consulting skills) to acquaint governments and citizens with the e-government concept, and to consolidate the numerous online government services. Large-scale adoption leads to the infusion phase. Customization is used when citizens do not accept the one-size-fits-all solution. Initial studies of property-tax payment show that Web-enabled payment decreases processing costs from more than $5 to $0.22 per transaction. The potential savings of e-democracy could be as much as $110 billion. This framework for implementing e-democracy has been used as a basis by other researchers.

Researchers from the Netherlands present another framework required to implement local e-government planning (Vriens & Achterbergh, 2004). The authors recommend a three-stage framework. Stage 1 generates an e-government applications portfolio. A list of Web-enabled IT applications is created. In stage 2, the required changes to the technological, organizational, and human-resources infrastructures to implement the e-government initiatives are identified. Stage 3 defines the infrastructural- or application-specific projects for e-government implementation. Cost estimates are made, and projects are categorized in several planning scenarios to accommodate political priorities.

Sharma and Gupta (2003) suggest four layers to implement e-government. The first layer is the technical infrastructure in the form of local area networks, Internet connectivity, intranets, servers, and so forth. The second layer represents the office automation or digitization and the integration of government data relating to various services. The third layer creates an official Web portal of government services in the form of an e-government portal. Layer 4 is where the government concerns itself with how the citizen receives the services. The framework for e-government also requires a legal and regulatory infrastructure. The support infrastructure includes an integrated network for banks and financial institutions to serve as an automatic clearing house, and a legal and regulatory framework. This will support payments online and protect privacy.

## EXAMPLES OF SUCCESSFUL IMPLEMENTATION

Change is difficult, especially with the bureaucracy embedded in the government. The Federal Highway Administration (FHWA) adopted a five-step project-management plan in their implementation of e-government. The existence of the FHWA, a division of the U.S. Department of Transportation, is to make the nation's roads safer. It is essential that the agency work with the state and local highway divisions around the country. Until the FHWA turned to the Internet, there was no single easily accessible, central clearinghouse for the wide range of technical resources that highway officials required (Battey, 2001). In 1998, the FHWA undertook the creation of an electronic community of practice for transportation experts and professionals to exchange information and best practices. The knowledge center allows collaboration and the sharing of information between the FHWA and highway officials throughout the country. The FHWA wanted to ensure that the site was not static because interactive collaboration was essential. The knowledge center was tasked with not only converting government documents into PDF (portable document format) and operating a bulletin board, but operating as a real-time collaboration vehicle. FHWA teamed with consultant American Management Systems to develop a program to transform the agency's culture into an electronically accessible transportation community.

According to Battey, they developed a five-step program for e-government implementation.

1. Get senior-level buy-in and focus on people.
2. Obtain necessary funds.
3. Identify strategic partners.
4. Emphasize technical considerations.
5. Plan for efficient transitions.

The Internal Revenue Service's (IRS's) customer-facing Web site, http://www.irs.gov, is a key e-government initiative. The IRS currently collects over $2 trillion in gross revenue, comprising 95% of the federal government's revenue (BEA, 2003). While electronic filing has been increasing rapidly, 77% of returns are still filed on paper. Reaching the Congressionally mandated goal of 80% electronically filed returns by 2007 will place enormous demands on the IRS Web site. This interactive Web site will have to accurately and securely conduct millions of transactions per day. To effectively handle yearly increases in electronic filing, the IRS had to significantly upgrade the site.

The major problem with the IRS' old Web site was that information was difficult to find. The Treasury wanted a new and improved site that would arrange content in ways that make it significantly easier to access and use. The Web site modernization project initially called for a secure, easy-to-navigate design that would make it simpler to find information and tax forms, and allow taxpayers to file online. The proposed plan also needed to provide increased access to persons with disabilities. For the second phase of the project, the IRS' goals included decreasing the number of tax-related forms that an employer must file, providing timely and accurate tax information to employers, increasing the availability of electronic tax filing, and modeling simplified federal and state tax employment laws. The IRS focused on increasing customer access and service on their Web site. The IRS Web site currently receives an average of 80 million hits daily, and it has more than half a million pages, including access to hundreds of forms. The Web site enables the IRS to comply with the Government Paperwork Elimination Act and provide three-click access to information. The projected savings for the IRS and the Social Security Administration is $16 million in one year for staff, printing, and mailing costs. This solution also reduces the costs to states for processing wage and tax data by 5.6% (BEA, 2003).

The FDA issued a 2002 rule that requires certain labeling submitted for review with new drug applications (NDAs), certain biological license applications (BLAs), abbreviated new drug applications (ANDAs), and supplements and annual reports to be submitted to the agency in electronic format (Center for Food Safety and Applied Nutrition, 2004). This rule is the first FDA regulation to require the submission of information by electronic means. It is FDA's first regulation issued under the President's e-government initiative. Each year, the FDA receives more than 1,000 proposed labeling changes for NDAs and BLAs, and more than 2,600 proposed original and supplemental labeling changes for ANDAs.

In response to the e-government directive from the President's Management Agenda, the Department of Labor (DOL) initiated an e-government strategy to improve DOL's service delivery to its customers through the integration of four primary components. The first, organizational capability, incorporates the policies, plans, people, and management processes that are required to support the e-government strategy. This assessment identified existing workforce capabilities in terms of workload and competencies, determined future workforce requirements in the context of e-governmental requirements, and devised strategies to eliminate gaps, both current and future, between workforce capabilities and workforce requirements. The second, customer relationship management (CRM), includes the methodologies, technologies, and capabilities that help DOL identify customers, evaluate their needs, and determine how to meet and continuously improve customer service. The third, enterprise architecture (EA), is the explicit description and documentation of the current and desired relationships among business and management processes and IT. And the last, security and privacy, develops and implements security policies and procedures to address threats and vulnerabilities as well as risk mitigation and management.

## FACTORS THAT CONTRIBUTE TO THE SUCCESS OR DIFFICULTY OF IMPLEMENTATION

E-governments still face a certain amount of distrust from their citizens. Many are wary because of privacy and security concerns. It is a challenge for the governments to address this issue. There are various schemes used such as public-key infrastructure (PKI) systems to protect electronic interaction both internally and externally, but trust for these will evolve slowly. A PKI is a sophisticated encryption system using digital signatures that assures electronic information is protected while being entered, during transit, and when stored in a computer (Forno & Feinbloom, 2001). As the number of Internet transactions with government increases, so does the risk of data being stolen or misused.

It is also essential that agencies publicize the existence of government-service portals. The public needs to be educated about the existence of online services and information. A constant challenge is how to pay for e-

government infrastructure. For example, the typical American state spends 1% to 2% on information technology. This makes it challenging for rapid progress in online services. Alternative financial models exist, but they are based on commercial advertising and user fees, posing risks in commercialization or reliance on user fees (West, 2004).

## CONCLUSION

The E-Government Act of 2002 requires the federal government to use Internet-based information technology to enhance citizen access to government information. The United States is not the only country to encourage the e-government principle. Project planning is vital to the successful implementation of this initiative. There are a variety of theories available to establish a strong implementation plan and strategy. The common elements include a technical infrastructure for Internet connectivity, office digitization and the integration of government data relating to various services, the creation of an official Web portal of government services in the form of an e-government portal, and a user-access layer where the citizen can access the various services. The implementation of e-government varies across different countries as well as types of government (local, state, federal). There are a variety of challenges to the successful implementation and use of e-government principles, which include technical, personnel, and legal issues. Developing countries have the challenge of providing the infrastructure and funds for network, application, security, data, and content tools, and hardware and software system to support e-government. Planning the transformation to e-government is the single most important issue facing most governments today. Constant technological changes affect people's reception and perception of the new way of conducting business with their government.

## NOTE

The views expressed in this paper are solely those of the authors and not of any federal government agency.

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## KEY TERMS

**Digitization:** Process of converting a physical item (e.g., paper, sound recording, picture, video) into a digital format.

**E-Government Infrastructure:** Environment where government conducts business electronically with citizens, businesses, other government agencies, and its own employees.

**E-Government Strategy:** Action plan to achieve the government's goals and objectives, which can then be observed and measured, as well as to identify and prioritize key initiatives.

**Electronic Filing:** Filing a document with a government agency by transmitting it in electronic format.

**Public-Key Infrastructure (PKI):** Encryption system that uses a public and private cryptographic key pin that is obtained and shared through a trusted authority that allows users of unsecured public networks such as the Internet to securely and privately exchange data.

# Cyber Attacks



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## INTRODUCTION

Information systems (computers and networks) are increasingly the targets of attacks ranging from vandalism to serious crimes (Richardson, 2003). Since government systems are valuable resources for a society, it is important to protect them from such attacks. Unfortunately, however, government systems can be especially vulnerable (Lucasik, Goodman, & Longhurst, 2003). This is in part because government is distributed over many locations, and therefore, it is hard to protect all of its information systems well. Second, many government systems must be accessible to a wide range of people (even if through a government intermediary), unlike the specialized systems used in other settings, and users will include a few fools and criminals. Third, governments often use popular business software, and the more popular that software is, the more attacks are known against it. Finally, there are many people with antipathy or grudges against governments for one reason or another, and they may seek revenge by attacking a government's information system and data. With the global Internet, attackers need not be in the same country as the government they attack.

Therefore, it is important to become familiar with the kinds of possible attackers, attacks, and countermeasures that governments could encounter on their computer systems and computer networks (Boswoth & Kabay, 2002; Schwartau, 2001).

## BACKGROUND

Government information systems see several kinds of attackers (The Honeynet Project, 2004):

- Disgruntled citizens who might attack computer systems in revenge. No government can please all of its citizens, and since government procedures can be irritating, there are plenty of motives. However, the disgruntled usually confine themselves to giving false data or to doing simple vandalism such as changing government Web pages.
- Disgruntled government employees and government contractors who may attempt to sabotage or to embarrass government systems. Since they are insiders, they can do considerable damage. Thus, it is important not to give any employee too much power.
- Hackers, or amateur attackers who enjoy breaking into computer systems (Chirillo, 2002). Contrary to media coverage, most do little damage.
- Political opponents who might try to attack computer systems, but this will be rare, since most digital governments should be politically neutral.
- Spies who try to obtain secrets (Shulsky & Schmitt, 2002). All governments have secrets on their computers, and there are many kinds of spies. This involves exploration and may entail setting up electronic backdoors for easier access.
- Criminals who can exploit computer systems, for example, to steal money and services or tools to get them credit card numbers (Boni & Kovacich, 1999; Loader & Thomas, 2000). Computer crime is increasing every year.
- Cyber terrorists, or terrorists who attack information systems (Verton, 2003). There has been little evidence of them so far, but they could create considerable damage with minimal effort.
- Military information-warfare specialists who develop ways to attack the information systems of other countries during war (Denning, 1999). They are well trained, not easily discouraged, and use methods that are difficult to detect. Most computers and networks can be subverted quickly by such determined adversaries.

## TYPES OF ATTACKS

The field of information security analyzes attacks on information systems and develops countermeasures (Schneier, 2000; McClure, Scambray, & Kurtz, 2001). Some classic attacks include the following:

- Defacement and modification of Web pages to criticize their owners or to make political points, as by Chinese hackers in 2000 to Japanese government sites to protest a meeting about Japanese actions in 1937.
- Overwhelming a system by sending it too much data or making too many requests. This is called a denial-

of-service (DOS) attack, because it impedes legitimate users who are sharing the same resource. The U.S. White House (president) Web site was attacked this way on May 3, 2001.

- Spam or useless e-mail that wastes mail resources, often combined with phishing, or computerized scams to steal passwords and other private information by fooling a user into volunteering it. These are increasing problems on government computer systems (U.S. Government Accounting Office, 2005).
- Guessing passwords and encryption keys for secrets. This is possible when passwords and keys are short or consist of English words. Then an attacker can impersonate someone on the information system and access his or her files. For example, someone got the password of a U.S. Air Force employee in August 2005 and viewed personnel records of 33,000 people.
- Exploiting flaws in software to circumvent access controls. Unlike most products, software rarely comes with a guarantee that it works correctly. There are plenty of bugs in commercial software (including operating systems), some of which can be exploited by attackers. Many of the dangerous ones involve privilege escalation, or finding loopholes to gain system-administrator privileges. For instance, testers hired by the State of Maryland in the United States in 2003 showed that they could break in to the state's voting machines and modify the votes, even remotely, due to flaws in the software.
- Buffer overflows, the most common type of software flaw, which allow privilege escalation by failing to check for too large of input. While good programmers do not make this error, software (including the Windows operating system) written in the programming languages C and C++ must check this explicitly, and some programmers forget this.
- Inserting Trojan horses, or innocent-looking programs that secretly either damage software or benefit the attacker in some way. To insert them, an attacker can: (a) send them attached to an e-mail message that encourages the reader to run it; (b) encourage a user to download them from a Web site; and (c) induce a user to insert a storage device that contains them into his or her computer. The Taiwan government alleged in 2003 that China was distributing Trojan horses specifically designed to break in to their government systems.
- Computer viruses and worms inserted onto computer systems via Trojan horses or by breaking in. These programs reproduce themselves automatically, wasting resources and causing collateral damage. For instance, some U.S. Customs computer systems were shut down by a virus for five hours on August 18, 2005, creating backups for arriving international flights.
- Spyware is a Trojan horse that tracks what users do on a computer and reports this information surreptitiously to a collection site. Current instances mostly just report what Internet sites a user visits, but spyware could be used for more serious spying, too.
- Directly modifying the operating system of a computer by replacing key parts of it with the attacker's programs (from a rootkit). This gives an attacker complete control over a computer system.
- Eavesdropping on traffic on a computer network. A smart attacker might pick up passwords, keys, and other insufficiently concealed secrets, particularly on local-area networks.
- Eavesdropping on computer systems and networks electronically via inadvertent electromagnetic radiation. Older cell phones are easy targets, and much electronic hardware provides radiation that can be picked up with antennas (Smulders, 1990). The U.S. embassy in Moscow long was a target of Soviet electronic eavesdropping.
- Social engineering (Mitnick, 2002), or manipulation of people to trick them into revealing secrets, passwords, and keys that are necessary to break into computer systems. Some classic methods are (a) calling an employee and claiming an emergency that requires their password and (b) doing favors for an employee and then suggesting reciprocation.
- Physical theft of a computer or its storage media. A stolen computer can give up its secrets rather easily.
- Physical damage to a computer or its storage media as a form of vandalism.

## COUNTERMEASURES AGAINST CYBER ATTACKS

Defenders of an information system can use a variety of countermeasures, depending on the kind of attack and their resources.

### Education

Employees of an organization must be aware of the kinds of attacks that can occur and what they should do about them. This includes learning proper operating procedures, the key attack targets (like passwords), and the classic attack methods. Some studies have shown education to be more effective than any other countermeasure for protecting information systems, since knowledge of information-systems security is not a requirement for most jobs.

## Legal Responses

Laws prohibit all the attacks we have mentioned, but do not do much to prevent them. In the United States, laws prohibit eavesdropping on communications and damage to computers, which covers most of the attacks we have mentioned, and many other countries have similar laws. But most attackers do not worry about getting caught, since it is hard to track them down, and laws are hard to apply. Laws, however, can be effective against repeat offenders within a given legal jurisdiction, like spies selling secrets.

## Patches

It is important to fix flaws or bugs in software as soon as they are discovered, since attacks typically are launched within days of the discovery of major flaws. Manufacturers provide patches, security updates, or service packs to fix flaws; they are in the form of modified software that a user must go to on a Web site to download. The Web site www.cert.org, among others, keeps a current listing of known flaws in important commercial software and their patches. Software that has been sold for a significant period of time generally requires fewer future patches, because programmers have had more time to find and fix its flaws, so buying just-released software products is not a good idea.

## Backups

Since many attacks destroy data or programs, making copies (backups) of digital information is essential to recovery from attack. Backups need to be done for any critical information and need to be stored some distance from the systems they track so no common disaster (e.g., fire, flood, earthquake) affecting both locations is likely. Optical-disk storage is preferable for backups, because it cannot be damaged as easily as magnetic media can be. A backup can be an entire duplicate computer system, when it is important to maintain continuous operation.

## Access Controls

Automated access controls are important for cyberspace (Pfleeger & Pfleeger, 2002). Access controls for computers generally are managed by passwords that must be supplied to log on and to use resources. Controls can be set for individuals or for groups of people, and they can apply separately to reading, writing, or execution of resources or to the ability to extend those privileges to other users. Access controls for networks are enforced by firewalls, dedicated computers on a local-area network that restrict traffic to and from the network according to simple rules on such features as origin and communications protocol. Unfortunately, access controls are vulnerable to many attacks already mentioned and generally will not protect against attacks by insiders like staff.

## Encryption

Encryption hides data in some form that cannot easily be read; the user then supplies a character-string key to decode it when he or she needs it (Pfleeger & Pfleeger, 2002). Any attempts to modify encrypted data will result in undecipherability, so the user can tell if encrypted messages or programs have been modified (or repeated, if a time is included in the message). Strong and virtually unbreakable methods of encryption have been developed recently with public-key cryptography. Software for it is available for free download from a number of Web sites. Encryption methods also can be used for authentication or to provide digital signatures on documents to prove who wrote them and when. Encryption has been touted as a solution to many security problems, but it is overrated. If an attacker gains system-administrator privileges, he or she may be able to get keys or to disable encryption methods without the user's knowledge.

## Intrusion Detection and Computer Forensics

Logging records the events on a computer system or network. This can generate enormous amounts of data, so intrusion-detection systems (IDSs) (Proctor, 2001) can be set up to check and record just the events that might indicate an attack and alert system administrators when matters become serious. IDSs can be located on individual computers (host-based) or on networks (network-based). They are important defensive tools against a broad range of known attacks including Trojan horses. Most look for signatures or bit patterns of known attacks, but a few look for anomalies or statistically suspicious behavior and, thus, can detect some new kinds of attacks. IDSs are useful but are not perfect, since attackers try hard to disguise their attacks. Other signature checking is provided by stand-alone virus and worm checkers like Norton AntiVirus, which examine files on a computer system.

For new or complex attacks, computer forensics is needed (Prosise & Mandia, 2001) as methods for inspecting computer storage after an attack to determine how the attack was accomplished and what damage it did. Forensics includes a wide variety of techniques and requires an intelligent investigator to use considerable judgment. Thus, it requires time and only can be done after the attacker is gone.

### Honeypots

Honeypots and honeynets (networks of honeypots) provide richer log information about cyber attacks (The Honeynet Project, 2004; Spitzner, 2003). These are systems with no legitimate purpose other than to receive attackers, so everyone using them other than their system administrator is inherently suspicious. Honeypots need not explicitly invite attackers—once they are on the Internet, attackers can find them with automated tools. However, they can be dangerous if attackers use them as springboards to attack other sites. For this reason, reverse firewalls of various kinds must keep the attack from spreading. But an attacker may infer the existence of the honeypot from the restrictions of the reverse firewall, so a honeypot cannot remain effective forever.

### Intrusion Prevention Systems

Most of the methods discussed so far just react to attacks. The alternative is an active network defense, which in its simpler forms is called an intrusion-prevention system. This includes simple things like turning off the Internet connection or logging out a user when they become sufficiently suspicious, as judged by an intrusion-detection system. It also can include forms of limiting damage such as denying the user certain resources, downgrading the user's priority, or delaying the user.

### Backtracing

Backtracing is a form of active network defense that tries to find where an external attack is coming from in order to stop it more easily. Unfortunately, most Internet protocols do not make it easy to backtrace, since a key idea of the Internet is to make only local decisions about routing traffic. Backtracing is also virtually impossible with serious attackers, who take care to come in via a long sequence of sites through many countries and jurisdictions. It is difficult to get the cooperation of all of those jurisdictions, and the attacker will be long gone by the time anyone succeeds in tracing him or her. One hope for backtracing is that when you suspect who is responsible for attacks, you will be able to get a court order to monitor the machines the suspect uses in order to collect evidence. Another idea is to install modified networking software in Internet routers that would collect details of messages. Assuming this does not violate privacy laws, such modified software could be mandated for all government computers. But it is easy for attackers to go through at least a few sites outside the government, thereby terminating backtracing there.

### Counterattacking

A more irresponsible form of active network defense is trying to counterattack whatever machine is attacking you. This became available in a product from Symbiot Security in 2004 and undoubtedly has been done elsewhere. Again, this won't work against insiders. Since most serious attacks use intermediate machines to attack yours, such a response often only will hurt a site or a computer that is an innocent bystander. Even if it works and if you do hurt the attacker, attacks easily could escalate with resultant collateral damage.

### Deception

Deliberate deception also has been proposed for active network defense (Rowe & Rothstein, 2004). Systems could lie, cheat, and mislead attackers to prevent them from achieving their goals. Deception is particularly useful for time-critical, military-style attacks such as those by cyber terrorists or information-warfare experts, when just delaying an attack a while could buy time to find a more permanent defense. Deception has been used in honeypots (Cohen, 1999) to keep the attacker interested. Fake files can be put on a honeypot to make it look more like a normal machine, and fake sites can be programmed to respond like real network nodes. Deception is equally useful against insider and outsider attacks.

## FUTURE TRENDS

The lack of powerful general countermeasures means that attacks on computer systems and networks will continue to increase in the future. A shift in attackers from amateurs to professionals will continue as basic countermeasures become more effective at deterring amateurs. Among the countermeasures currently available, education, legal responses, backups, access controls, and honeypots will remain important in the future. But patches, encryption, intrusion detection, computer forensics, honeypots, simple active network defense, backtracing, and deception will increase in importance as technical details of their implementation are worked out. Despite their weaknesses, countermeasures do help to protect systems, since they have raised the necessary level of sophistication required by an attacker to succeed.

## CONCLUSION

Attacks on the software and data of computer systems and networks are increasing. Digital government is more

vulnerable to these attacks than other information systems because of its accessibility and the number of motivated attackers. While threats can be exaggerated (Ranum, 2004), it is essential that government systems anticipate threats and plan to respond to them, since relatively modest attacks could bring government to a halt for hours or days. Some of the countermeasures to protect systems involve purchase of software and hardware, some require institution of policies, and some involve new actions to be taken. No single countermeasure will suffice, but a wide range of countermeasures must be employed in a coordinated information-security strategy.

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## KEY TERMS

**Computer Forensics:** Methods for analyzing what has happened after a computer has been broken into or attacked.

**Cyber Terrorism:** Terrorism applied to computer systems and networks, typically those related to critical infrastructure of a country or organization.

**Cyberwar:** Warfare applied to computer systems and networks.

**Denial of Service:** An attack on a computer system in which the system is so overwhelmed by useless processing that it cannot adequately serve legitimate users.

**Encryption:** The conversion of data to a form in which it cannot be read without supplying a key or decoding string.

**Firewall:** A computer that protects a local-area computer network by scanning for suspicious data or activity in its incoming or outgoing traffic.

**Hacker:** An amateur who breaks into computer systems primarily for the fun of it.

**Honeypot:** A computer system designed to encourage attacks in order to enable the study of attack methods.

**Information Security (Infosec):** Methods for protecting computer systems and networks from attack.

**Information Warfare:** Attacks on computer systems, networks, and data as a tactic of warfare.

**Privilege Escalation:** Surreptitiously obtaining system-administrator privileges on a computer system.

**Social Engineering:** Systematic manipulation of people for personal gain; a term particularly used for attacks on computer systems through manipulation of their users.

**Spyware:** A Trojan horse that relays information about user activities on a computer.

**Trojan Horse:** A computer program hidden within another and designed to change a computer system in some way in order to benefit an attacker.

**Virus:** A Trojan horse that reproduces itself repeatedly on a computer system, damaging the system.

**Worm:** An autonomous program designed to reproduce itself repeatedly on a computer system and thereby waste resources.

# Data Mining and Homeland Security



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## INTRODUCTION

A significant amount of attention appears to be focusing on how to better collect, analyze, and disseminate information. In doing so, technology is commonly and increasingly looked upon as both a tool, and, in some cases, a substitute, for human resources. One such technology that is playing a prominent role in homeland security initiatives is data mining. Similar to the concept of homeland security, while data mining is widely mentioned in a growing number of bills, laws, reports, and other policy documents, an agreed upon definition or conceptualization of data mining appears to be generally lacking within the policy community (Relyea, 2002). While data mining initiatives are usually purported to provide insightful, carefully constructed analysis, at various times data mining itself is alternatively described as a technology, a process, and/or a productivity tool. In other words, data mining, or factual data analysis, or predictive analytics, as it also is sometimes referred to, means different things to different people.

Regardless of which definition one prefers, a common theme is the ability to collect and combine, virtually if not physically, multiple data sources, for the purposes of analyzing the actions of individuals. In other words, there is an implicit belief in the power of information, suggesting a continuing trend in the growth of "dataveillance," or the monitoring and collection of the data trails left by a person's activities (Clarke, 1988). More importantly, it is clear that there are high expectations for data mining, or factual data analysis, being an effective tool.

Data mining is not a new technology but its use is growing significantly in both the private and public sectors. Industries such as banking, insurance, medicine, and retailing commonly use data mining to reduce costs, enhance research, and increase sales. In the public sector, data mining applications initially were used as a means to detect fraud and waste, but have grown to also be used for purposes such as measuring and improving program performance. While not completely without controversy, these types of data mining applications have gained greater acceptance. However, some national defense/homeland security data mining applications represent a significant expansion in the quantity and scope of data to be analyzed. Moreover, due to their security-related nature, the details of these initiatives (e.g., data sources, analytical techniques, access and retention practices, etc.) are usually less transparent.

## BACKGROUND

### What is Data Mining?

Data mining involves the use of sophisticated data analysis tools to discover previously unknown, valid patterns and relationships in large data sets (Adriaans & Zantinge, 1996). These tools can include statistical models, mathematical algorithms, and machine learning methods (algorithms that improve their performance automatically through experience, such as neural networks or decision trees). Consequently, data mining consists of more than collecting and managing data, it also includes analysis and prediction.

Data mining can be performed on data represented in quantitative, textual, or multimedia forms. Data mining applications can use a variety of parameters to examine the data. They include association (patterns where one event is connected to another event, such as purchasing a pen and purchasing paper), sequence or path analysis (patterns where one event leads to another event, such as the birth of a child and purchasing diapers), classification (identification of new patterns, such as coincidences between duct tape purchases and plastic sheeting purchases), clustering (finding and visually documenting groups of previously unknown facts, such as geographic location and brand preferences), and forecasting (discovering patterns from which one can make reasonable predictions regarding future activities, such as the prediction that people who join an athletic club may take exercise classes) (Han & Kamber, 2001; Taipale, 2003; Two Crows Corporation, 1999).

As an application, compared to other data analysis applications, such as structured queries (used in many commercial databases) or statistical analysis software, data mining represents a *difference of kind rather than degree*. Many simpler analytical tools utilize a verification-based approach, where the user develops a hypothesis and then tests the data to prove or disprove the hypothesis. For example, a user might hypothesize that a

customer who buys a hammer, will also buy a box of nails. The effectiveness of this approach can be limited by the creativity of the user to develop various hypotheses, as well as the structure of the software being used. In contrast, data mining utilizes a discovery approach, in which algorithms can be used to examine several multidimensional data relationships simultaneously, identifying those that are unique or frequently represented. For example, a hardware store may compare their customers' tool purchases with home ownership, type of automobile driven, age, occupation, income, and/or distance between residence and the store. As a result of its complex capabilities, two precursors are important for a successful data mining exercise; a clear formulation of the problem to be solved, and access to the relevant data (Makulowich, 1999).

Reflecting this conceptualization of data mining, some observers consider data mining to be just one step in a larger process known as knowledge discovery in databases (KDD). Other steps in the KDD process, in progressive order, include data cleaning, data integration, data selection, data transformation, *data mining*, pattern evaluation, and knowledge presentation (Han & Kamber, 2001).

A number of advances in technology and business processes have contributed to a growing interest in data mining in both the public and private sectors. Some of these changes include the growth of computer networks, which can be used to connect databases; the development of enhanced search-related techniques, such as neural networks and advanced algorithms; the spread of the client/server computing model, allowing users to access centralized data resources from the desktop; and an increased ability to combine data from disparate sources into a single searchable source (Adriaans & Zantinge, 1996).

In addition to these improved data management tools, the increased availability of information, and the decreasing costs of storing it, have also played a role. Over the past several years, there has been a rapid increase in the volume of information collected and stored, with some observers suggesting that the quantity of the world's data approximately doubles every year (Adriaans & Zantinge, 1996). At the same time, the costs of data storage have decreased significantly from dollars per megabyte to pennies per megabyte. Similarly, computing power has continued to double every 18-24 months, while the relative cost of computing power has continued to decrease.

Data mining has become increasingly common in both the public and private sectors. Organizations use data mining as a tool to survey customer information, reduce fraud and waste, and assist in medical research. However, the proliferation of data mining has raised some implementation and oversight issues as well. These include concerns about the quality of the data being analyzed, the interoperability of the databases and software between agencies, and potential infringements on privacy. Also, there are some concerns that the limitations of data mining are being overlooked as agencies work to capitalize on new means to collect data.

## Limitations of Data Mining

While data mining products can be very powerful tools, they are not self-sufficient applications. To be successful, data mining requires skilled technical and analytical specialists who can structure the analysis and interpret the output that is created. Consequently, the limitations of data mining are primarily data or personnel-related, rather than technology-related (Klosgen & Zytkow, 2002; Martinez-Solano, Giblin, & Walshe, 2005).

Although data mining can help reveal patterns and relationships, it does not tell the user the value or significance of these patterns. These types of determinations must be made by the user. Similarly, the validity of the patterns discovered is dependent on how they compare to real-world circumstances. For example, to assess the validity of a data mining application designed to identify potential terrorist suspects in a large pool of individuals, the user may test the model using data that includes information about known terrorists. However, while possibly re-affirming a particular profile, it does not necessarily mean that the application will identify a suspect whose behavior significantly deviates from the original model.

Another limitation of data mining is that, while it can identify connections between behaviors and/or variables, it does not necessarily identify a causal relationship. For example, an application may identify that a pattern of behavior, such as the propensity to purchase airline tickets just shortly before the flight is scheduled to depart, is related to characteristics such as income, level of education, and Internet use. However, that does not necessarily indicate that the ticket-purchasing behavior is caused by one or more of these variables. In fact, the individual's behavior could be affected by some additional variable(s), such as occupation (the need to make trips on short notice), family status (a sick relative needing care), or a hobby (taking advantage of last minute discounts to visit new destinations) (Two Crows Corporation, 1999).

## Data Mining Challenges

As data mining initiatives continue to evolve, there are several issues for the policy community to consider related to implementation and oversight. These issues include, but are not limited to, data quality, interoperability,

mission creep, and privacy. As with other aspects of data mining, while technological capabilities are important, other factors also influence the success of a project's outcome (Zeanah, 2004).

## Data Quality

Data quality is a multifaceted issue that represents one of the biggest challenges for data mining. Data quality refers to the accuracy and completeness of the data. The structure and consistency of the data being analyzed can also affect data quality. The presence of duplicate records, the lack of data standards, the timeliness of updates, and human error can significantly impact the effectiveness of the more complex data mining techniques, which are sensitive to subtle differences that may exist in the data. To improve data quality, it is sometimes necessary to "clean" the data, which can involve the removal of duplicate records, normalizing the values used to represent information in the database (e.g., ensuring that "no" is represented as a 0 throughout the database, and not sometimes as a 0, sometimes as an N, etc.), accounting for missing data points, removing unneeded data fields, identifying anomalous data points (e.g., an individual whose age is shown as 142 years), and standardizing data formats (e.g., changing dates so they all include MM/DD/YYYY) (Hernandez & Stolfo, 1998).

## Interoperability

Related to data quality is the issue of the interoperability of different databases and data mining software. Interoperability refers to the ability of a computer system and/or data to work with other systems or data using common standards or processes. Interoperability is a critical part of larger efforts to improve interagency collaboration and information sharing through e-government and homeland security initiatives. For data mining, interoperability of databases and software is important to enable the search and analysis of multiple databases simultaneously, and to help ensure the compatibility of data mining activities of different agencies. Data mining projects that are trying to take advantage of existing legacy databases, or that are initiating first-time collaborative efforts with other agencies or levels of government (e.g., police departments in different states), may experience interoperability problems. Similarly, as agencies move forward with the creation of new databases and information sharing efforts, they will need to address interoperability issues during their planning stages to better ensure the effectiveness of their data mining projects (Wang & Oppenheim, 2003).

## Mission Creep

Mission creep is one of the leading risks of data mining cited by civil libertarians, and represents how control over one's information can be a tenuous proposition (Markle Foundation, 2003). Mission creep refers to the use of data for purposes other than that for which the data was originally collected. This can occur regardless of whether the data was provided voluntarily by the individual or was collected through other means.

Efforts to fight terrorism can, at times, take on an acute sense of urgency. This urgency can create pressure on both data holders and officials who access the data. To leave an available resource unused may appear to some as being negligent. Data holders may feel obligated to make any information available that could be used to prevent a future attack or track a known terrorist. Similarly, government officials responsible for ensuring the safety of others may be pressured to use and/or combine existing databases to identify potential threats. Unlike physical searches, or the detention of individuals, accessing information for purposes other than originally intended may appear to be a victimless or harmless exercise. However, such information use can lead to unintended outcomes and produce misleading results.

One of the primary reasons for misleading results is inaccurate data. All data collection efforts suffer accuracy concerns to some degree. Ensuring the accuracy of information can require costly protocols that may not be cost effective if the data is not of inherently high economic value. In well-managed data mining projects, the original data collecting organization is likely to be aware of the data's limitations and account for these limitations accordingly. However, such awareness may not be communicated or heeded when data is used for other purposes. For example, the accuracy of information collected through a shopper's club card may suffer for a variety of reasons, including the lack of identity authentication when a card is issued, cashiers using their own cards for customers who do not have one, and/or customers who use multiple cards (Technology and Privacy Advisory Committee (TAPAC), 2004). For the purposes of marketing to consumers, the impact of these inaccuracies is negligible to the individual. If a government agency were to use that information to target individuals based on food purchases associated with particular religious observances though, an outcome based on inaccurate information could be, at the least, a waste of resources by the government agency, and an unpleasant experience for the misidentified individual. As the March 2004 Technology and Privacy Advisory Committee (TAPAC) report observes, the potential wide reuse of data suggests that concerns about mission creep can

extend beyond privacy to the protection of civil rights in the event that information is used for "targeting an individual solely on the basis of religion or expression, or using information in a way that would violate the (U.S.) constitutional guarantee against self-incrimination" (2004, p. 39).

## Privacy

As additional information sharing and data mining initiatives have been announced, increased attention has focused on the implications for privacy. Concerns about privacy focus both on actual projects proposed, as well as concerns about the potential for data mining applications to be expanded beyond their original purposes (mission creep). For example, some experts suggest that anti-terrorism data mining applications might also be useful for combating other types of crime as well (Clark, 2003). So far, there has been little consensus about how data mining should be carried out, with several competing points of view being debated. Some observers contend that tradeoffs may need to be made regarding privacy to ensure security. Other observers suggest that existing laws and regulations regarding privacy protections are adequate, and that these initiatives do not pose any threats to privacy. Still other observers argue that not enough is known about how data mining projects will be carried out, and that greater oversight is needed. There is also some disagreement over how privacy concerns should be addressed. Some observers suggest that technical solutions are adequate. In contrast, some privacy advocates argue in favor of creating clearer policies and exercising stronger oversight. As data mining efforts move forward, a variety of questions are raised, including, the degree to which government agencies should use and mix commercial data with government data, whether data sources are being used for purposes other than those for which they were originally designed, and the possible application of privacy laws to these initiatives (DeRosa, 2004).

# FUTURE TRENDS

Data mining is used for a variety of purposes in both the private and public sectors. Industries, such as banking, insurance, medicine, and retailing, commonly use data mining to reduce costs, enhance research, and increase sales. For example, the insurance and banking industries use data mining applications to detect fraud and assist in risk assessment (e.g., credit scoring). Using customer data collected over several years, companies can develop models that predict whether a customer is a good credit risk, or whether an accident claim may be fraudulent and should be investigated more closely (Fawcett & Provost, 2002). The medical community sometimes uses data mining to help predict the effectiveness of a procedure or medicine. Pharmaceutical firms use data mining of chemical compounds and genetic material to help guide research on new treatments for diseases. Retailers can use information collected through affinity programs (e.g., shoppers' club cards, frequent flyer points, contests) to assess the effectiveness of product selection and placement decisions, coupon offers, and which products are often purchased together. Companies, such as telephone service providers and music clubs, can use data mining to create a "churn analysis," to assess which customers are likely to remain as subscribers and which ones are likely to switch to a competitor (Dillon, 1998; Two Crows Corporation, 1999).

In the public sector, data mining applications were initially used as a means to detect fraud and waste, but they have grown also to be used for purposes such as measuring and improving program performance, analyzing scientific and research information, managing human resources, detecting criminal activities or patterns, and analyzing intelligence information. In a recent survey of U.S. government departments and agencies, 199 data mining initiatives being conducted by 52 agencies were identified. For example, the Government Accountability Office (formerly the General Accounting Office) has used data mining to identify prohibited purchases made through government purchasing programs or with government credit cards. The U.S. Mint uses data mining to reduce false positives and improve information security for its network monitoring activities. The Justice Department has been able to use data mining to assess crime patterns and adjust resource allotments accordingly. Similarly, the Department of Veterans Affairs has used data mining to help predict demographic changes in the constituency it serves so that it can better estimate its budgetary needs (General Accounting Office (GAO), 2003, 2004). It has been reported that data mining has helped the federal government recover millions of dollars in fraudulent Medicare payments. Another example is the Federal Aviation Administration, which uses data mining to review plane crash data to recognize common defects and recommend precautionary measures (Cahlink, 2000).

Most recently, though, data mining has been increasingly cited as an important tool for anti-terrorism efforts. Some observers suggest that data mining should be used as a means to identify terrorist activities, such as money transfers, by identifying unusual patterns of money flows, and communications, by charting and analyzing all of the contacts made by an individual. Likewise, data mining could be used to identify and track individual terrorists themselves, such as through travel and immigration

records. In the United States, three initiatives in particular highlight the role of data mining in homeland security initiatives, as well as some of the policy challenges they face. The initiatives include the now-discontinued Terrorism Information Awareness (TIA) program1 conducted by the Defense Advanced Research Projects Agency (DARPA), the Computer-Assisted Passenger Prescreening System II (CAPPS II) project (now canceled and replaced by Secure Flight), and the Multistate Anti-Terrorism Information Exchange (MATRIX) project being coordinated by the Florida Department of Law Enforcement (FDLE).

## CONCLUSION

While the policy community remains divided on the merits of specific data mining initiatives, there appear to be some signs of acceptance of the growing use of data mining, provided that appropriate protections are in place and enforced. As previously discussed, while technological capabilities are important, there are other implementation and oversight issues that can influence the success of a data mining project's outcome. The challenges of data quality, interoperability, mission creep, and privacy can all serve to undermine or misdirect data mining initiatives. Equally important to an initiative's success or failure is the cultivation of public awareness and support. The sereptious development of a data mining application aimed at the general population breeds mistrust, and is more likely to generate a vociferous backlash than an initiative that involves potential stakeholders. However, that is not to say that there should be complete transparency either. While transparency is a critical feature of democracy, there are legitimate security reasons for not disclosing all of the technical and analytical aspects of a security-related data mining application. A balance must be struck between enabling openness and oversight, and adherence to the appropriate security protocols.

The discussion of data mining presented here provides merely a snapshot in time. As technology evolves, additional information becomes more accessible, and application demands continue to develop, it is likely that there will be a growth in government use data mining. Moreover, data mining will not be the sole province of national governments. Provincial and local governments, both individually and collaboratively, are likely to push ahead with data mining initiatives of their own in a much more diverse regulatory environment. Looking ahead, then, as more pools of data are collected, combined, and analyzed, one can anticipate that the potential privacy, accuracy, and security concerns will multiply. The larger question, though, is whether the potential benefits of this data mining (i.e., improved efficiency, reduced fraud, better-targeted services) will outweigh the potential costs (i.e., increased surveillance, embedded errors, exploitation of new pools of data)?

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## KEY TERMS

**Dataveillance:** The systematic use of personal data systems in the investigation or monitoring of the actions or communications of one or more persons.

**Data Cleaning:** Process of fixing incomplete data, resolving inconsistencies, and removing "noisy data" (unwanted data) in a data set.

**Data Mining:** The use of sophisticated data analysis tools to discover previously unknown, valid patterns and relationships in large data sets.

**Data Warehouse:** A central repository of data from across the enterprise that is used for analytical applications, user inquiries, and/or strategic decision making.

**Interoperability:** The ability of different operating and software systems, applications, and services to communicate and exchange data in an accurate, effective, and consistent manner.

**Knowledge Discovery in Databases (KDD):** The most widely recognized definition, as written by Fayyad, Piatetsky-Shapiro, & Smyth (1996)—"the non-trivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data."

**Metadata:** Data about data. Data that describes important characteristics of data, such as the information contained, how it was collected, what format it is in, and other details that may be important to using the data.

**Mission Creep:** The use of data for purposes other than that for which the data was originally collected.

**Privacy:** The condition of being secluded from others.

## ENDNOTE

[1] This project was originally identified as the Total Information Awareness project until DARPA publicly renamed it the Terrorism Information Awareness project in May 2003.

# Deconstructing the South African Government's ICT for Development Discourse

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## INTRODUCTION

The post-apartheid South African government has placed ICTs at the centre of the national agenda for social and economic development (Mbeki, 1996, 2002b; Presidential National Commission on the Information Society and Development (PNC on ISAD), 2003a). The question of whether the application of technologies to improve information and communication access can increase the capabilities of disadvantaged and poor people is central to whether the new ICTs (particularly the Internet) will support or undermine real development. Technology appears in the South African government's ICT for development discourse as a politically neutral force with the power to develop, and without which people are classified as *information-poor*. As Wajcman (2002) cogently argues, "governments everywhere legitimate much of their policy in terms of a technological imperative" (p. 348). One effect of this discourse is to render poor people passive and dependent, as objects to be developed, rather than as active agents of development. Failure to address these assumptions may lead social scientists to become complacent in distracting attention away from the very *real* global economic, social, and cultural inequalities, to *virtual* inequalities, which merely hide an unwillingness to address the core failings of the development paradigm.

The paper attempts to meet the challenge put forth by Robert Wade (2002):

*The current campaign to promote the uptake of information and communication technologies (ICTs) in developing countries and to get aid donors to redirect their aid budgets needs devil's advocates to challenge what John Stuart Mill once called 'the deep slumber of a decided opinion.' (*p. 443)

## BACKGROUND

The real test of the success of ICTs in development efforts is whether they ultimately contribute to reducing poverty and inequality, thereby improving the lives and livelihoods of the poor. Two important questions emerge from the debate: (1) Who will have access to ICTs and the networks formed? and (2) Who will have control not only of the technology and its application, but of data gathered and processed, and of information exchanged via different modes?

The paper makes the following assumptions: (1) technology is *socially shaped*; and (2) the direction and nature of technological development does not necessarily follow some inevitable trajectory, but rather is a component of a complex, multi-dimensional system of social, cultural, political, and economic change. Further, the paper is premised on the belief that: (1) technology, in and of itself, is neither positive nor negative (Kranzberg, 1985), what Heidegger (1977) refers to as "the ambiguous essence of technology" (p. 33); and (2) the deployment of ICTs is the consequence of human choices which are themselves constrained and shaped by social context. Simply put, ICTs are context-dependent (i.e., they are contingent on uses and applications in particular contexts).

Developing at the end of the 19th century in an era of rapid capitalist industrial expansion and the rise of powerfully intrusive states, Touraine (1988) maintains that the social sciences have been overly preoccupied with positivistic explanation and unduly shaped by an emphasis on order and control. This has left little room for human agency and on the individual actor in social science theories. To regain relevance and validity in the social sciences, Touraine (1988) urges social scientists to become *participant-observers*.

The author has been a participant-observer in numerous government ICT forums (e.g., the Government Information Technology Officers' Council (GITOC), the knowledge and information management (KIM) sub-committee, the Universal Services Agency (U.S.), the Presidential National Commission on the Information Society and Development (PNC on ISAD), the Department of Communication's electronic commerce discussion process and various discussion colloquia on telecommunications, ICT convergence policy, etc). Collectively, these experiences have been a rich source of data gathering for the paper. By operating as a reflexive critic and a participant-observer, the researcher is well positioned to question the highly problematic set of assumptions underpin-

ning the South African government's ICT for development discourse.

## TECHNOLOGICAL DETERMINISM

The benefits of ICTs for the poor are seen as intuitively, self-evident, and universally valid by the South African government. It is clear that government has invested a great deal of faith in the power of ICTs to fast-track development (Matsepe-Casaburri, 2002a, 2003; Zuma, 2002). The optimistic view of government focuses heavily on technology potential rather than on adapting appropriate information systems to meet the real needs of poor communities in different environments. Further, this rose-tinted view of technology fails to adequately deal with the constraints for accessing and applying ICTs by the poor. What is urgently needed is a more integrated framework for understanding both information and ICTs in relation to poverty alleviation and development.

The optimistic view of the South African government needs to be tempered in the light of evidence showing that learning is a critical feature of technological change (Bell & Pavitt, 1993; Giuliani & Bell, 2005; Lall, 1992). Further, the importance of ICTs for addressing the real information needs of the poor has tended to be overstated and there is a danger of the policy debate becoming too strongly focused around the capabilities of emerging technologies.

It would appear as if government is underplaying the constraints that make it difficult for the poor to access, assess, and apply information through ICTs. These include lack of human capabilities (i.e., literacy, English language skills, and technical computer competence); urban/rural inequities; gender inequalities; affordability; and lack of relevant information content. Further, it takes time for people to comprehend the potential benefits of ICT-mediated information, or to be willing to trust information that does not derive from personal networks.

The information needs of poor households, communities, and small-scale enterprises should be understood in advance of proposing ICT-based solutions. Significant "financial opportunity costs" for poverty alleviation strategies are likely to arise, since large amounts of limited resources are being diverted to poorly conceived ICT-related investments that might not have a direct impact on the needs of the poor. There is also the risk that introducing digital information systems may supplant existing systems that may be more appropriate and more cost effective in terms of access and coverage. Moreover, over-emphasis on technological solutions can have the effect of drawing attention away from the underlying causes of poverty such as inadequate health and educational facilities.

As part of an integrated development strategy, ICTs can contribute to socio-economic development, but investments in ICTs alone are not sufficient for development to occur. ICT applications are not sufficient to address problems of rural access without adherence to principles of integrated rural development. Unless there is minimal infrastructure development in transport, education, health and social and cultural facilities, it is unlikely that investments from ICTs alone will enable rural areas to cross the threshold from poverty to growth.

Government has over-enthusiastically embraced the application of ICTs to address the pressing needs of the poor (Fraser-Molekete, 2002; Naidoo, 1998a-c). The major problem is that there is a widespread misunderstanding about how substantial benefits can be derived from ICTs for the poor. Persistent poverty, at both an individual and societal level, has deep and systemic roots. Chronic poverty, limited growth, and inequality are primarily the result of uneven access to material and financial resources.

The material deprivations of the poor are compounded by their lack of access to education, information, and knowledge; their lack of voice in the institutions and societal processes that shape their lives; and their inability to communicate effectively their needs, hopes, and expectations to those who have control over them. These deprivations are mirrored at the societal level by institutions and markets that function poorly, that are often unresponsive to the needs of the disadvantaged and disenfranchised, and that are all too frequently captured or are excessively influenced by economic, social, or cultural elites.

Government's discourse on ICTs for development is couched in the upbeat "we will all benefit from this" language (Mbeki, 1996, p. 1). There are times when it would seem as if government regards ICTs as the technical solution for poverty and underdevelopment (Mbeki, 2002a-b). The technological utopianism of government maintains that the digital world of the new ICTs holds the potential for breakthroughs in resolving the social problems of poverty and inequality in South Africa. The isolation of the poor can be ended and radical new approaches to poverty and social inequality can develop directly through the cyber-world (Ministry of Communications, 2001). The digital space holds potentials for conferring enormous economic benefits on society as a whole and its low-income segment in particular. It is for these reasons that government sees exclusion from the digital world as disastrous for those excluded.

There is a distinctive view in government that technology determines the nature of society (Matsepe-Casaburri,

2002b, 2003). ICTs have become idolised as a force that can "fix" the economy, raise the general standard of living and human well-being in the country, and deliver on poverty alleviation (Zuma, 2002). For government, the transfer of technology to poor communities is seen as unproblematic (Universal Service Agency (U.S.), 2002). It is not realised that such a transfer would depend not merely on technical elements, but on social and cultural factors as well. Technology is seen as neutral, not as an instrument for the creation of cultural and social orders. The understanding of technology, as part of a wider socio-economic system, is particularly important when the technology is adapted within environments very different from those for which it was originally intended (Schumacher, 1973). When technology is transferred from one society to another, it reflects the social values, institutional forms, and culture of the transferring country.

Since the outcomes of ICTs are open-ended, we have no reason to expect the emerging socio-technical system built around ICTs to remedy social inequalities in our society or to relieve the plight of the poor, any more than other major socio-technical changes have had such effects in the recent past. The three previous "communication revolutions," for example, have had significant impacts on society but failed to deliver the optimistic predictions first hoped for. The railway was believed to spark the *dictatorship of the proletariat*, the telegraph to engender world peace and the television to revolutionise education. It is highly unlikely then that ICT alone will end global poverty. In the long-term widespread adaptations to the new technological system will likely take place, just as broad social adaptations have been made to other socio-technological shifts (e.g., railways, automobiles, and electricity). But these adaptations are unlikely to remedy the fundamental, structurally based inequality between the poor and the well-to-do. Structural inequalities can be solved only by attacking them within the larger historical, cultural, and socio-economic matrix that generated them.

It would appear that the South African government is driven by a deterministic perspective on social development: technological innovations have a direct impact on social processes (PNC on ISAD, 2003a-b). This can be detected at all levels of discussion, both descriptive and predictive. There is no space for reflection on the myriad of complex ways in which technology and society are dialectically linked. The fact that technologies almost always have unintended and unplanned consequences is ignored. As much in its development as in its application and use, technology is intrinsically shaped by its economic, political and social environment (Williams & Edge, 1996).

There is a widespread approach in government that seems blinded by the "newness" and novelty of digital ICTs, and which, by emphasising the "revolutionary" character of the Internet and related technologies, tends to become (either deliberately or by negligence) ahistoric. To conceptualise technology and technological change outside of any social, economic, political, or cultural context can have several consequences. The first is that the approach becomes one of technological determinism, in which the technology is seen to act as an autonomous agent that has a direct effect on other social systems. Following MacKenzie (1984) and Winner (1993), Edge (1995) defines technological determinism as:

> *a belief…which holds that technical change is a prime cause of social change, and that technical innovations are themselves "*uncaused"*—in the sense that they arise only from the working out of an intrinsic, disembodied, impersonal 'logic', and not from any "social" influence.* (p. 4, emphasis in original)

Such accounts ignore the social shaping of technology and the fact that technologies and social life are interconnected (Groper, 1996; Schmidt, 2001). These approaches disregard the political, social, and cultural processes that necessarily accompany the development of any technological innovation, not least in the form of values, judgements and interests in operation that help structure Internet access and use (MacKenzie & Wajcman, 1999). Technological development comes to be seen as autonomous and self-generating. Technologies, however, are always situated within circuits of human action which provide their context and shape their direction.

## THE "SOCIAL SHAPING OF TECHNOLOGY" APPROACH

Edge (1995) critiques traditional approaches to the social analysis of technical change, emphasising the extent to which such approaches "imply a *technological determinism*, use a simplified *linear model* of the innovation process, tend to treat the technology as a 'black box,' and are preoccupied with the 'social impacts' of a largely predetermined technical 'trajectory'" (p. 14, emphasis in original). At a lecture entitled *The Question Concerning Technology*, delivered in 1955 in Germany, Martin Heidegger (1977) made the following prescient remark:

> *[W]e are delivered to [technology] in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology.* (p. 4)

That said, we should not replace technological determinism with social determinism. The view we subscribe to is that the "social" and the "technological" cannot be separated. New technology is as much a social product as the shape of society is a technological product. There is a constant interplay between "technology" and "society" (Loader, 1998; Lyon, 1988, p. viii).

The technical attributes of the new ICTs increasingly dominate explanations of contemporary change and development. There is a discernible tendency to understand or conceptualise these technologies in terms of technical properties and to construct the relation to the sociological world as one of applications and impacts. The challenge for social scientists is not so much to deny the weight of technology, but rather to develop analytic categories that allow us to capture the complex interweaving of technology and society.

It would appear that the "social shaping of technology" approach is beginning to take root in the social sciences (Klein & Kleinman, 2002; Kling, 2000; Pinch & Bijker, 1987; Rip, 1995; Sassen, 2002; Werle, 1998; Woolgar, 1991).

Following Heeks (2002), a reconceptualised "social shaping of technology" approach to ICTs is one which is:

- Centred on information rather than technology
- Integral to its environment
- Integrated with development objectives
- Indigenised

Such an approach potentially has the power to:

- Restore the agency of those rendered passive in the ICT for development arena
- Reorient technology to socially embedded, local uses
- Break down the binary of developed/underdeveloped, recognising poor people's knowledge and experience, and so opening up the possibility that "we" can learn from and with "them"

It cannot be assumed that the ICT-based information system will be beneficial or harmful without understanding the local social dynamics and how the technology will be used. This is especially the case since communities are complex and dynamic. ICT will be best used where it is embedded in existing social relations, and where it serves to extend the capacity of people to perform tasks they would wish to do, *even in the absence of ICT*. Moreover, from the literature on technology transfer (Archibugi & Michie, 1997; Archibugi & Pietrobelli, 2003), the role of local adaptive assimilation and learning is seen as key to successful implementation of technology in new settings. Learning, however, will not come about simply by local control of the technology. A level of technical competence and an understanding of the technology's potential are also required before local learning can take-off.

## CONCLUSION

The post-apartheid South African government has embraced the ideology that ICT represents modernisation; and it is seen as a key technology for alleviating poverty. The theoretical heritage of this perspective is linked to the modernisation school, which assumes that social change is unidirectional, progressive, and moves society from industrial (or pre-industrial in the case of least developed countries) to post-industrial with modern ICT as the engine. In much of government technicist rhetoric we find an implicit belief in an unproblematic causal progression from ICT innovations to social change (Fraser-Moleketi, 2002). Technological complexities, complex social processes, and independent human agency are not seriously considered.

It seems that the South African government is attracted to the neutral, instrumental view of technology, which is why it builds an increasingly central role for it in its vision of an "information society." Government has taken the technological configuration of the new ICTs as a "given" or prefigured system that needs to become more widely diffused to citizens. Hence, government rhetoric forecloses an assessment of the need for greater variety in the deployment of ICT configurations. The challenge, however, is to reorient this technology to socially embedded and locally-led development that affirms and makes use of the information, knowledge, and experience that poor people have.

There is clear evidence of technological determinism, which is steeped in a modernisation discourse arranged around political rhetoric and informed by a discursive power which rests on the universalisation of a particular, interpreted, theorised, and valorised regional (i.e., Western) experience. The imposition of policy legitimacy in terms of linking formalised systems of ideas with a recognised interpretation of a dominant Western experience formed within relations of power is set down in a hegemonic tradition (*pace* Gramsci, 1971) and widely accepted as proven and universally applicable.

By and large what emerges from a reading of government's ICT policy documents is a very optimistic view of the benefits to be harnessed from ICTs for poverty alleviation in South Africa.[1] This is surprising, given the recency of ICT developments and the paucity of solid empirical investigation of trends and impacts to date. Very little attention is paid to the costs, risks, and constraints that ICT diffusion is likely to entail. The fact that the poor face multiple barriers both to ICT utilisation and to ben-

efiting from that utilisation, since they have little to spend on communication; live in areas where the Internet is costly and complex to provide; have low rates of education and speak languages that are not very well represented on the World Wide Web, tends to be played down in policy debates. At best, this selective reading of ICTs for development oversimplifies a complex reality; at worst it is likely to result in wasted resources, poorly thought-out projects, and unrealistic expectations.

ICT for development programmes have a better chance of success if the poor are seen as autonomous agents of action and if they define a social process of change in terms of the growing role of independent autonomous action on the part of dominated groups. Such an exercise will, of necessity, entail a *self-analysis* that requires the active participation of social actors engaged in a collective struggle concerning political and social issues. It is imperative that we move away from the "heroic scenarios" and "intoxicating visions" (Bellamy & Taylor, 1998, p. 170) characterising much of government's discourse on ICTs for development, and attempt to re-conceptualise the complex and multi-layered relationship between ICT, poverty, and development.

Contrary to the South African government, the key to integrating ICTs in the fight against poverty, then, is not to begin with ICTs, nor to posit them as an essential need. Rather it is to determine the impediments to poverty alleviation and to reducing inequality in society and, thereafter, to ascertain the information, communication and knowledge components of these impediments. In the light of this, the task is to: (1) assess, on the basis of global experience, how ICTs, broadly deployed and properly adapted, could help address these impediments; and (2) to develop and implement a strategy for encouraging and supporting the deployment of ICTs, in support of, and subordinate to, a national poverty-reduction strategy.

Government needs to move away from analytical perspectives that are techno-centric and determinist, that focus on historical discontinuity (i.e., the "information revolution"), and that make unwarranted claims about the future impact of ICTs on the lives of the poor. Much more useful is the "social shaping of technology" approach, which puts the dynamic interaction between social forces and technological innovation into the forefront. This approach calls for proactive policy-making, since it stresses the imperative that *the technological solutions must be shaped to match the vision of a preferred future*. ICTs will not by themselves change existing institutional settings. The use of ICTs within the conventional social and institutional framework not only hampers these technologies full potential, but may also cause many frustrating social problems.

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## KEY TERMS

**Dictatorship of the Proletariat:** In Marxist theory the dictatorship of the proletariat refers to the ideal of proletarian supremacy following the overthrow of capitalism and preceding the classless state.

**Discourses:** The public or outward expression of (usually) unstated or implied ideological positions. Discourses connote values and these values are often assumed to reflect general endorsement. It is characteristic of discourses that they occur as self-evident truths or facts and therefore act to occlude oppositional or resistant discourses.

**Information and Communication Technologies (ICTs):** Reflects the technological convergence between digital computing, telecommunications, and broadcasting. Whereas computers were largely focused on the processing of information, ICTs undertake *both* processing and communication of information.

**Information Revolution:** Underscores a notion of historical discontinuity. The emphasis on historical discontinuity runs the danger of underestimating the continuities involved in the process, as much in the technological innovations as such as in their adaptation in the economic, social, and political contexts. Further, the term "information revolution" tends to imply that the technological discontinuity goes hand in hand with a revolutionary discontinuity in social and political relations. The empirical evidence does not live up to the proclaimed epochal dimensions of change. This then raises the question of what should change, thus opening up a wide field for ideological preferences of all sorts.

**Information Society:** Though as a heuristic device, the term information society has some value in exploring features of the contemporary world, it is far too inexact to be acceptable as a definitive term. In fact, the further one moves from grand national ICT plans and from futuristic forecasts of conditions prevailing within the information society, and the nearer one gets to actual social analysis in which technology is not perceived as a quasi-autonomous force acting upon society, the more questionable the concept of an information society appears.

**Social Shaping of Technology:** Technical change is no longer seen as autonomous or external to society, but as influenced and shaped by its societal context. Technology is inflected by the values, cultures, power systems, and institutional orders within which it is embedded. Thus, the social shaping of technology approach serves as a needed corrective to technological determinism.

**Technological Convergence:** ICTs are based on a long list of technological innovations and evolutions that took place earlier. Effectively, ICTs are characterised by a complex process of technological convergence between microelectronics, telecommunications, computing, and broadcasting. Thus, there is no single historical moment that can be named as its starting point

**Technological Determinism:** The notion that technological development is autonomous of society; it shapes society, but is not reciprocally influenced. In more extreme varieties of technological determinism, the technology is seen as the most significant determinant of the nature of a society. The reality, of course, is that technologies do not, in practice, follow some predetermined course of development. Also, although technologies clearly have impacts, the nature of these is not built into the technology itself, but varies from one culture to another, depending on a broad range of social, political, and economic factors.

## ENDNOTE

[1] Government sees an array of positive developments emerging from the information society, with increased productivity and better quality employment, decentralised and increased access to politi-

cal decision-making and potential for e-government and e-commerce to improve the lives of the poor (Centre for Public Service Innovation [CPSI], Department of Public Service and Administration [DPSA] & The State Information Technology Agency [SITA], 2003).

# Design of Government Information for Access by Wireless Mobile Technology



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## INTRODUCTION

As the world becomes mobile, the ability to access information on demand will give individuals a competitive advantage and make them more productive on the job and in their daily lives (Satyanarayanan, 1996). In the past, government information was presented by government employees who verbally communicated with citizens in order to meet their information needs. As print technology improved, government information was, and still is in many countries, communicated to citizens using paper as the medium of delivery. Because of the cost of printing and mailing printed documents and the difficulty of updating information in a timely manner, governments are moving to electronic delivery of information using the Web. Currently, governments provide digital service to their citizens using the Web for access by desktop or notebook computers; however, citizens of many countries are using mobile devices such as cell phones, tablet PCs, personal digital assistants, Web pads, and palmtop computers to access information from a variety of sources in order to conduct their everyday business and to communicate with each other. Also, wearable mobile devices are being used by some workers for remote computing and information access in order to allow multitasking on the job. It is predicted that there will be more mobile devices than desktop computers in the world in the near future (Schneiderman, 2002). The creation of digital government will allow the delivery of government information and services online through the Internet or other digital means using computing and mobile devices (LaVigne, 2002). Also, there will be more government-to-citizen and government-to-business interactions. Digital government will allow citizens, businesses, and the government to use electronic devices in order to communicate, to disseminate and gather information, to facilitate payments, and to carry out permitting in an online environment (Wyld, 2004). Digital government will allow citizens to access information anytime and anywhere using mobile and computing devices (Seifert & Relyea, 2004).

## BACKGROUND

According to O'Grady and O'Hare (2004), mobile computing will become the major computer usage model of the future. This will be possible since the digital divide is decreasing due to wireless access, increasing use of mobile devices, decreasing cost of Internet connections and computer technology, and transparent access of computer systems. Governments need to take advantage of technology-literate citizens and design and make available information for citizens to access government information digitally from anywhere and at anytime. This is important, since citizens expect the same level of service that is being given by businesses that are providing services and information anywhere and anytime (Dawes, Bloniarz, Connelly, Kelly, & Pardo, 1999). Users need just-in-time information for the job and in the community. The use of wireless mobile devices will facilitate access of government information from anywhere and at anytime. Also, computing is becoming ubiquitous, where citizens will work from anywhere and access government information from many networks using wireless mobile devices (Huber, 2004; Perry, O'Hara, Sellen, Brown, & Harper, 2001).

Before the use of mobile devices to access government information and design of information for mobile access are discussed, it is important to examine the information processing required when citizens access digital government information. Citizens acquire government information at many levels. At the lowest level, citizens may want to be aware of what is happening in government, so they will read the information in order to be informed. For example, some citizens may want to know the changes made to tax regulations. At the next level, citizens and businesses may want to access government to apply the information to complete everyday tasks. For example, some occupations require that businesses and citizens follow approved safety procedures when completing tasks. This requires comprehension and application of the information. At the highest level, citizens and businesses may want to critically analyze, synthesize, and evaluate

government information for research purposes. To achieve this, citizens will have to access government information from many sources through ubiquitous computing using mobile devices.

## USE OF MOBILE DEVICES TO ACCESS DIGITAL GOVERNMENT INFORMATION

There are many benefits to the use of mobile devices to access digital government information. According to a recent report by the European Commission (2004), digital government can provide better quality public service, reduce waiting time for information and service, lower administrative costs for businesses, and allow higher productivity for the public. Using mobile devices will allow citizens to access government information from anywhere and at anytime. With the use of wireless mobile technology, users do not have to be connected physically to networks in order to access information, and the mobile devices are small enough to be portable, which allows users to take the devices to any location to send and retrieve information. For example, a worker in the field who requires specific government regulations while completing a task can use a mobile device to access the information just in time. If government regulations in a field change, the government can update the digital information to allow individuals and businesses to access the current information immediately. In addition, a worker in the field can use a mobile device to contact a government employee remotely and to request specific information for immediate use.

Mobile devices have many benefits for accessing government information; however, there are some limitations of mobile devices of which designers of government digital information must be aware when designing information for delivery on mobile devices. Some of the limitations of mobile devices in delivering government information include the small screen size for output of the information and the small input devices for accessing the information (Ahonen, Joyce, Leino, & Turunen, 2003). Designers of information must be aware of these limitations when designing government digital information for access by mobile devices and must design for ease of use. Rather than scrolling for more information on the screen, users of mobile devices must be able to go directly to the information and move back and forth with ease. Information should be targeted to the users' requests when they need it and should be presented efficiently to maximize the display of the information on the mobile device screen. The interface of the mobile device must be appropriate for individual users and the software system should be able to customize the interface based on individual user's characteristics.

## Designing Government Digital Information for Mobile Devices

As the evolution of delivery medium of information changes, so does the strategy for processing the information. According to Grudin (2004), prior to writing and print, most information access and interaction were done by listening, memorizing, and speaking. With the print medium, information acquisition strategies were reading, analyzing, and writing. As government information becomes digital, acquisition strategies include searching, synthesizing, and constructing. Designers of government information for mobile devices must design for the new information acquisition and interaction strategies.

Most government information tends to be text-based, which takes longer for users to process and interpret. This is because past government information was designed for printing on paper for delivery to citizens. Designers of digital government information must use the capability of the computer to present information visually as well as textually in order to facilitate efficient processing and acquisition of the information. According to Paivio's (1986) theory of dual coding, information storage and retention is enhanced when information is represented both in verbal and visual forms. Presenting material in both textual and visual forms will involve more processing, which will result in better storage and integration of information in memory (Mayer, Fennell, Farmer, & Campbell, 2004).

In addition, because of the limited display capacity of mobile devices, government information must be designed for display using rich media such as audio, video, pictures, and graphics. Tabbers, Martens, and van Merrienboer (2004) found that for Web-based multimedia information, students who received visual cues to pictures scored higher on an information retention test compared to students who did not receive the cues for the pictures. According to cognitive psychology, information acquisition is an internal process, and the amount retained depends on the processing capacity of the user, the amount of effort expended while reading the information, the quality of the processing, and the user's existing knowledge structure (Ausubel, 1974). These have implications for how government information is designed for mobile devices. Designers must include strategies that allow the user to activate existing cognitive structure in order to conduct quality processing of the information. Mayer, Dow, and Mayer (2003) found that when a pedagogical agent was present on the screen as information was narrated to students, students who were able to ask

questions and receive feedback interactively performed better on a problem-solving transfer test compared to students who only received on-screen text with no narration. It appears that narration by an intelligent agent encouraged deep processing, which resulted in better information acquisition and higher-level information processing. This suggests that government should use audio to present government information to citizens.

## Guidelines for Designing Government Digital Information for Mobile Devices

### Chunk Information for Efficient Processing

Designers of government materials for mobile devices must use information presentation strategies to enable users to access and process the information efficiently because of the limited display capacity of mobile devices and the limited processing capacity of human working memory. Information should be organized or chunked in the form of information objects of appropriate and meaningful size to facilitate storage and processing in working memory (Ally, 2004).

### Adapt the Interface to the User

To compensate for the small screen size of the display of the mobile device, the interface of the mobile device must be designed properly (Ally, 2004). Mobile access to government information requires interface designs for multi-mobile device access and intelligent agents to adapt the interface to the user (Nylander, Bylund, & Boman, 2004). The interface can be graphical and should present limited information on the screen in order to prevent information overload in short-term memory. Users must be able to jump to related information without too much effort. The interface must allow the user to access the information with minimal effort and to move back to previous information with ease. For interaction sessions that are information-intense, the system must adjust the interface in order to prevent information overload. Some ways to prevent information overload include presenting less information on one screen or organizing the information in the form of graphical outlines to give the overall structure of the information and then presenting the details by linking to other screens with the details. The interface also must use good navigational strategies to allow users to move back and forth between information displays. Navigation also can be automatic, based on the intelligence gathered on the user's current position in the information and the information needs of the user.

### Design for Minimum Input to Retrieve and Access Information

Because of the small size of the input device on mobile devices, information access must be designed to require minimum input from users. Input can use pointing or voice input to minimize typing and writing. Because mobile devices allow access of information from anywhere at anytime, the device must have input and output options in order to prevent distractions when using the mobile devices. For example, if someone is using a mobile device in a remote location, it may be difficult to type on a keyboard or to use a pointing device when accessing government information. The mobile technology must allow the user to input data using voice input or touch screen.

### Target Government Information to the User

One of the variables that designers tend to ignore when they develop information for mobile devices is the user of the devices. Different users have different styles and characteristics, and some users may be more visual, while others may be verbal (Mayer & Massa, 2003). A graphic outline of the information can be presented before the details are presented in order to cater to users who prefer to get the big picture before they go to the details of the information. Government information must be designed with the user in mind to facilitate efficient access and processing.

Government systems must be smart and should have built-in intelligence in order to customize and target the information for individual citizens. Information must be personalized by selecting and aggregating information according to the user profile (Huber, 2004). Intelligent software systems can be built to develop an initial profile of the user based on current and previous interaction with the government information database and then present materials that will benefit the specific user, based on the user profile. As the intelligent agent interacts with the user, it learns about the user and adapts the format of the information, interface, and navigation pattern according to the user's style and needs.

### Use Visual Outline to Show the Structure of the Information

A visual outline can be used to show the main ideas in the information and the relationship between the ideas rather than to present information in a textual format. High-level visual outline can be used to represent information spatially so that users can see the main ideas and their

relationships (Novak, Gowin, & Johanse, 1983). Tusack (2004) suggests the use of site maps as the starting point of interaction to which users can link back in order to continue with the information.

## TRENDS IN USING MOBILE DEVICES FOR ACCESSING GOVERNMENT INFORMATION

The use of mobile devices with wireless technology allows access of government information from anywhere and at anytime and will dramatically alter the way that work is conducted (Gorlenko & Merrick, 2003). For example, mobile devices can make use of global positioning and satellite systems to send and receive government information digitally. There will be exponential growth in the use of mobile devices to access government information, since the cost of the devices will be lower than desktop computers and a user can access information from anywhere and at anytime. Also, the use of wireless mobile devices by businesses and organizations will be more economical, since it does not require the building of the infrastructure to wire buildings for employees and customers. The challenge for designers of government information for mobile devices is how to standardize the design for use by different types of mobile devices. Government information systems need to have agents to deliver the right information to the user. A profile agent can be used to learn about the user and then to interact with a presentation agent in order to customize and format the information to meet the user needs (O'Grady & O'Hare, 2004).

## CONCLUSION

Government information was designed for delivery on paper medium. Governments need to rethink and redesign information for delivery on mobile devices. Future development of information for mobile devices should concentrate on the user to drive the development and delivery (Gorlenko & Merrick, 2003). Mobile devices can be used to deliver government information to users, but the materials must be designed properly to compensate for the small screen of the devices and the limited processing and storage capacity of users working memory. Design principles for government information on mobile devices are the same as design principles for other applications such as education and training. The only difference is that government information tends to be one way, and there is less interaction with the information, since the purpose of most government information is to inform citizens. More research should be conducted on how to improve security and privacy of government information on mobile devices. Also, the type of information presented on mobile devices must match the needs and the styles of the users. Government information systems must use the power of computer technology in order to develop intelligent agents to customize the information for users and to provide context-sensitive information. According to Rist and Brandmeier (2002), more research is needed on how to flexibly translate government information from one medium into another format and how to decide which media combinations are most appropriate, considering a mobile user's style, current task, and situation. Finally, governments need to shift from print and desktop delivery of information to delivery on mobile devices in order to make the transition to becoming mobile government (m-government).

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## KEY TERMS

**Concept Map:** A graphic outline that shows the main concepts in the information and the relationship between the concepts.

**E-Government:** The delivery of government information and services using electronic technologies.

**Information Object:** Digital information stored in chunks in a digital repository and tagged for retrieval to meet users' information needs.

**Intelligent Agent:** A computer application software that is proactive and capable of flexible autonomous action in order to meet its design objectives set out by the designer.

**Interface:** The components of the computer program that allow the user to interact with the information.

**Mobile Device:** A device that can be used to access information from anywhere and at anytime. The device consists of an input mechanism, processing capability, a storage medium, and a display mechanism.

**Pervasive Computing:** Use of computer devices to access information from interconnected networks using wireless technology.

**Ubiquitous Computing:** Computing technology that is invisible to the user because of wireless connectivity and transparent user interface.

**User:** An individual who interacts with a computer system to access information.

**Wearable Computing Devices:** Devices that are attached to the human body so that the hands are free to complete other tasks.

# Development and Use of the World Wide Web by U.S. Local Governments

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## INTRODUCTION

San Carlos, California (www.cityofsancarlos.org) claims to have developed one of the earliest local government Web sites in the world, posted on May 10, 1994 (San Carlos, 2006). From this early effort, United States (U.S.) cities moved rapidly onto the Web. Norris and Moon (2002), for example, report that some 4.4% of U.S. cities in a 2000 survey by the International City Management Association (ICMA) reported developing Web sites before 1995; 27.1% reported developing their Web sites in the 1995-'96 time period, and 68.5% reported their Web site developed after 1997. San Carlos' original Web site comprised one page; its current Web site now contains some 8,000 pages and uses some of the Web's most modern technology available, such as really simple syndication (RSS) and Flash Paper.[1] This article uses the example of San Carlos' Web site, along with two surveys of local government Web sites in the U.S., to illustrate the experience that U.S. local governments have had in developing and using Web sites in the pursuit of bettering governance. The article examines four local government Web applications—bulletin boards, promotions, service delivery and citizen input—and assesses their use by U.S. local governments. The article then addresses current issues of outsourcing Web site design and maintenance, and future issues of privacy, security, the digital divide and the possible effects of increased local government Web sites on U.S. civil society.

## BACKGROUND

Some idea of the expanse and number of city Web sites can be obtained by consulting one of several search engines to locate local government Web sites. One such engine, containing links to some 10,235 Web sites, is State and Local Government (www.statelocalgov.net). This site provides not only links to local government Web sites in the U.S. but also to national organizations that represent state and local governments (e.g., U.S. Council of Mayors) and a functional area listing of service Web sites for state and local government (economic development, tourism, etc.). Another such engine is Official City Sites (www.officialcitysites.org), which not only lists local governments (towns, cities, counties, etc.) in the U.S. but also in Australia, Canada, France, Germany, Japan, The Netherlands, New Zealand and the United Kingdom. The Official City Sites Web page is particularly attractive, with clickable stylized maps of the individual countries leading to individual maps or lists of sub-units within that country (states, provinces, etc.) and then to the local Web sites within those sub-units.[2]

## LOCAL GOVERNMENT WEB APPLICATIONS

In previous work (Scavo & Shi, 1999; Scavo, 2003), we identified four types of Web applications that local governments tended to use: bulletin board applications; promotion application; service delivery applications; and citizen input applications. Bulletin board applications involve the use of a Web site to provide information about the services, personnel, programs and so forth provided by a government agency. Promotion applications have to do with the provision of information about the area—population characteristics; climate data; tourist attractions; and so forth. Service delivery applications are much more interactive than the previous two; involving the use of the Web to do such things as apply for licenses, pay taxes and make appointments. Last, citizen input applications allow citizens to communicate directly with government officials and personnel and also with each other (Scavo, 2005).

The four applications demonstrate an increasing level of Web application sophistication—the base is bulletin board usage. Posting basic information on government was the original function of local government Web sites—at first, some of this information was simply posted; later, much of the information became clickable, meaning that clicking on the name of the mayor, for example, would open a dialog box that would allow the user to send an e-mail to or chat with the mayor. Promotion applications are only somewhat more sophisticated than bulletin board applications. With these latter applications, information is posted, as with bulletin boards, but the information has a somewhat different focus and audience. Service deliv-

ery and feedback applications are more sophisticated than the previous two, with feedback being even more specialized than service delivery. Both of these applications require more technically sophisticated Web sites which, in turn, require more highly trained Web site designers and maintenance people, faster servers and, most likely, a greater financial investment by the local government in Web site design and operation. Scavo and Shi (1999) found empirical support for this hierarchy of applications and concluded that it seemed likely that local governments would introduce themselves to the Web by developing bulletin boards and promotion applications and then move into service delivery and feedback applications.

Scavo (2003) found that while U.S. local governments had generally improved their Web sites across the four utilizations from 1998 through 2002, there was a great deal of random movement within this increase. The mean score for all local governments on the overall Web feature scale increased dramatically between 1998 and 2002, as did the scores (some much less dramatically) for the sub-scales for the four utilizations, indicating improvement. However, the across-time correlations for the four sub-scales were low, varying between 0.00 and +.25, indicating a great deal of random variation among the Web sites. And, five local governments that had Web sites (one county and four municipalities) in 1998 did not have them in 2002, indicating some retrenchment.

The four applications are of varying interest to constituencies inside the city or those outside the city; promotion utilizations being the most interesting to external constituents (who may be considering relocating to the given area and want to investigate weather, schools, transportation facilities, etc.), and service delivery applications are of the greatest interest to internal constituents, who have the largest stake in the services local government provides (see Table 1).

San Carlos' Web site demonstrates good use of the four utilizations described above. Sections of the city's main Web page address the bulletin board utilization (headlines, agendas and minutes, city newsletters, municipal code, news releases, job announcements, etc.), promotion (business guide, restaurant guide, schools, transportation, etc.), service delivery (garbage and recycling, guide to utility services, service requests and compliments, parcel and zoning information, permits by fax, etc.) and citizen input (forms on the Web, report traffic complaints, comment on development proposals, etc.). Users can click on any of the items and are directed to relevant Web pages for further information or contact.

In 2004, Brown University's Center for Public Policy surveyed federal, state and local government Web sites around the U.S. to examine the features that the Web sites provided. Some 1,873 Web sites in the 70 largest cities[3] in the U.S. were assessed for the types of features they offered to the user. The Brown study found that the most common types of services provided by these city Web sites were the renewal of library books and the payment of utility bills and parking tickets. Barriers to the increased use of Web sites to provide services were shown to be the inability to use credit cards and digital signatures on Web financial transactions. Only 14% of the Web sites allowed credit card use, while 6% allowed the use of digital signatures (West, 2004). These numbers, however, were a marked increase from those in the 2003 version of this survey.

## CURRENT ISSUES IN LOCAL GOVERNMENT WEB SITE DESIGN AND MANAGEMENT

The evolution in Web site design by local government across the four applications described above was a phenomenon of the 1990s that may not have survived the transition to the new century. In the early 1990s, Web site design was often something that local government IT professionals learned on the job; few if any academic programs existed that taught such skills. Even as late as 1998, some city Web sites were designed as university class projects. By the early 2000s, much of this tentative introduction to the Web had been abandoned and even cities' initial forays into Web site use were quite sophisticated. Part of the reason for this is the changing nature of local government Web site administration and management. In 1998, national or regional Web-hosting companies did not administer a single one of the Web sites surveyed; by 2002, those same-type companies administered some 8% of the Web sites. As city Web sites became more sophisticated (and more expensive to design and maintain) and it became increasingly more difficult to recruit and retain IT professionals, an increased number of cities began contracting out the design and mainte-

*Table 1. City Web utilizations by type of constituency*

| | **Type of Utilization** | | | |
|---|---|---|---|---|
| **Constituency** | **Bulletin Board** | **Promotion** | **Service Delivery** | **Citizen Input** |
| **Internal** | Primarily | | Almost Wholly | Almost Wholly |
| **External** | | Primarily | | |

nance of their Web sites to national or regional companies who specialize in such activities. A 2001 ICMA survey found that 80% of U.S. city managers queried reported outsourcing Web site hosting, while 64% reported outsourcing Web site design and/or Web site operations and management (Norris, Fletcher & Holden, 2001). Web hosting companies, such as ProjectA (www.projecta.com), NIC (www.nicusa.com), the Alpha Group (http://alphais.com) and egovt.net—now part of cboss (www.cboss government.com), have all aggressively moved into local government Web management and design. Scavo (2003) found, however, that outsourcing of Web design and maintenance was much more popular for small cities in the U.S. than it was for larger ones. As of 2002, local governments that maintained their own Web sites showed a mean population somewhat more than 300,000; those that used local organizations showed a mean population of slightly less than 150,000; and those that contracted out Web design and maintenance showed a mean population of just more than 40,000.

Early criticisms of outsourcing of Web site design and management stressed the need to retain the expertise in Web-related matters that might be lost if the services passed out of the hands of local government into those of contractors. In partial response to this, professional associations like ICMA have developed low-cost or free Web design software (e.g., GovOffice) that can be easily adapted to a variety of city Web design uses (www.govoffice.com). Additionally, various organizations that support local governments in the U.S. have sought to reduce the costs of building internal Web expertise by publishing online manuals and offering other free or low-cost resources on Web site design and management. Some of these relevant organizations and their Web sites are The Center for Technology in Government (www.ctg.albany.edu), Government Technology (www.govtech.net) and Public Technology Inc. (http://pti.nw.dc.us).

## FUTURE ISSUES IN LOCAL GOVERNMENT WEB SITE DESIGN AND MANAGEMENT

In recent years, one of the major issues surrounding Web usage has been the so-called digital divide—the difference in Internet and Web usage between relatively advantaged and disadvantaged groups in the population. While early differences in Internet and Web access usage between men and women, minorities and the majority, wealthy and poor, and even urban and rural dwellers have either narrowed greatly or largely disappeared, newer gaps persist. Several of the more pernicious problems that U.S. local government Web sites have yet to address are meeting the needs of users who are disabled, those who speak languages other than English and those with lowered literacy. The Brown study, for example, found that the cities they surveyed were not particularly successful in addressing these needs. Only some 21% of the Web sites surveyed passed the "Bobby" test (http://bobby.watchfire.com)[4], a widely used test of the accessibility of Web sites to the disabled, while only 17% of the Web sites provided some accommodation for non-English speakers.[5] And the mean grade level at which the Web sites were aimed was approximately 11.1, with some 71% of the Web sites aimed at the 12$^{th}$-grade level at a time when the typical American is reading at the 8$^{th}$-grade level (West, 2004). For all of these, however, there was a large degree of inter-city variation. Cities with the most accessible sites for the disabled were Cincinnati (95% of sites meeting the Bobby test) and San Diego (94%); those with the most accessible sites for non-English speakers were Houston (93%) and Kansas City (92%); while those with the most accessible sites for those with lowered literacy rates were Salt Lake City (mean grade level of 8.5) and Grand Rapids, Michigan (8.6).

Security and privacy are also issues that U.S. local government Web sites have shown varying degrees of success in addressing. For users to develop similar levels of trust in using the advanced features of service provision and feedback in local government Web sites as they have in the analogous features of business Web sites, local governments need to provide similar levels of security. Many users who would not give a second thought to ordering books online from Amazon.com hesitate when it comes to paying their local taxes online. Perhaps some of the reason for this has to do with the earlier evolution of e-business to e-government, but some of it may have to do with the lowered level of trust in U.S. government in general as opposed to business (Holzer, Meltiski, Rho, & Schwester, 2004). It is still odd, however, that users would, for example, input their credit card information into an e-business Web site with far more trust than they would input their voter information into an e-government Web site, when it would be far more troublesome to the user for the credit card information to be misused than it would be for the voter information to be misused.

Web site security has two different meanings—the first, discussed above, is the confidentiality of the information provided by the user to the Web site. The second, however, is the potential dangers in the information actually posted on the Web site. In the wake of the September 11, 2001 (9/11) terrorist attacks in the U.S., this second aspect of Web site security became a much greater issue in the U.S. than it had before. One immediate consequence of these attacks was a re-evaluation by many local governments about the openness of their

Web sites, especially the provision of large amounts of information to potential terrorists. Earlier efforts—commonly known as community right-to-know laws—required U.S. local governments to publicly list potentially harmful chemicals (these lists moved from paper listings to Web-based listings over time). These requirements were relaxed since, in some places, such information was thought to be too useful to potential terrorists. For many years, government Web sites were touted as ways to inexpensively increase the amount of information the public could access; in response to 9/11, even such openness advocates as Steve Aftergood, the director of the Federation of American Scientists' Project on Government Secrecy, rethought the organization's stand on how much information should be made available to the public. In late 2001, Aftergood said in an interview, "I have had to come to terms with the fact that government secrecy is not the worst thing in the world … There are worse things" (Toner, 2001, p. B4).

The managers of U.S. local government Web sites have also become much more cognizant of the sensitivities of user privacy. As more Web sites are being used to gather information on users, many U.S. cities have responded with elaborate privacy statements addressing the use of their Web sites. Several are indicative—Austin, Texas, for example, contains a 650-word policy statement that describes the types of information the site gathers on users (time of day of contact, day of week of contact, URL of site consulted before the city Web site, etc.), how that information is used (it will not be sold for commercial purposes but may be surrendered to law enforcement agencies requesting the information), the nature of the site's security routines, and that the site uses cookies. Austin's nearby neighbor, San Antonio, Texas, states in its privacy policy that it does not gather any personal information about users, except in the most general fashion—number of hits, for example. Other U.S. city sites take positions between these two, for example, certifying that they do not use cookies but that Web sites linked to the city Web site may indeed use cookies. Thus, there does not appear to be one standard for cities in terms of the types of information the sites gather about users, but there does appear to be an evolving standard that the user should be informed about what types of information is being gathered, how that information will be used and so on.

One additional future issue needs to be addressed—that of the type of local culture that increased use of Web-provided services may be creating. As more local government services are moved online, physical interactions between citizens and employees become less frequent. A result of this may be a lowered sense of empathy by citizens with local government employees. This tendency brings with it a larger question—can an Internet-based community replace a physical one? Will future citizens, whose predominant interactions with local government are on the Web, understand and appreciate physical problems and issues occurring in the communities in which they live? While there has been much speculation about the effect of Web-based interactions on civil society (Cain, 2001; Levine, 2002), there has been little empirical research on this issue; thus, this is a subject crying out for future research.

## CONCLUSION

This article has examined the development and use of Web sites by U.S. local governments. The article demonstrates that local governments in the U.S. have been and remain very active in the development and use of Web sites to deliver services, promote local government activities, communicate with citizens and so forth. However, while there is a great deal of activity, there could be more—local government use of Web sites has not yet attained the level that U.S. business, for example, makes of the Internet.

Beyond the question of resource availability, a good part of the reason for this lowered level of development in government Web sites in the U.S. has to do with low levels of trust in U.S. government in general. Internet users who trust e-business to maintain the confidentiality of electronic financial information might not trust local e-government to do the same with other forms of electronic information. But the causality may run both ways—U.S. local governments that inspire trust from their citizens may also have an easier time implementing advanced Web functionalities that those citizens will use, while local governments that inspire lower levels of trust would have a more difficult time. Local government Web usage does not arise nor does it function in a vacuum; it is part of local government culture. Where that culture features mutual trust, local government Web sites can develop into very sophisticated instruments of e-government. When the culture features mistrust, that development will be stilted.

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## KEY TERMS

**Blog:** A Web log; basically, a diary posted on the Web available for users to access. Blogs can provide first-hand observations of events, reflections on current events and so forth.

**Bobby Test:** An online test of a Web site's accessibility to the disabled. The test reports the site's conformance with either the World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines 1.0 or the U.S. Americans with Disabilities Act Section 508 Guidelines.

**Branding:** A marketing concept in which all pages on a Web site have a consistent, unique visual appearance, thus associating all of them with the agency or institution that sponsors the Web site.

**Cookies:** Short text files generated by a Web server and automatically stored in the user's computer for future access. Cookies store information about how the user has used the Web site in the past so that future use can be more customized. They can also store other personal information about the user; this information is transmitted to a relevant Web site when the user accesses that site.

**Digital Divide:** Differential Internet and Web access and usage by different groups—originally men and women or minorities and the majority; now rural and urban, non-native speakers and native speakers; disabled and non-disabled; and so forth.

**Flash Paper:** A program developed by Macromedia that allows documents to be formatted in a way that they can be easily transmitted to users over the Web.

**Really Simple Syndication (RSS):** A way of retrieving information on the Web where the user subscribes to a Web site or blog and information is delivered automatically to the user's e-mail address in conformance with the information supplied by the user in his or her subscription.

## ENDNOTES

1. A history of the evolution of San Carlos' Web site can be found at http://web.archive.org/web/*/http://www.ci.san-carlos.ca.us/.
2. Official City Sites has recently changed its Web site since it has come under the management of bigdaddydata.com. The new version of the Web site does not function in the same way as the old one, and the information stated in this paragraph may not be able to be retrieved.
3. The Web sites represented executive offices, legislative offices and major service delivery agencies, such as health, human services, police, fire, taxation, and so forth.
4. Oddly, the San Carlos Web site also does not pass the Bobby test. The site showed two Priority One Accessibility errors and six Priority One User Checks. A variety of Priority Two and Three errors also were reported for the Web site.
5. These accommodations ranged from providing text translations into commonly used second languages to routing a user to one of several Web translation services.

# Development Stages of Digital Government

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## INTRODUCTION

In recent years, a number of authors have reported studies on the emergence and development of digital government or e-government using various criteria (Forlano, 2004; Holliday, 2002; Kaaya, 2004; Layne & Lee, 2001; Netchaeva, 2002; Reddick, 2004; Silcock, 2001; Stowers, 1999, 2004; UN, 2001, 2002, 2004). From such studies, models have been proposed which indicate two to six stages of e-government development. Some of the models place emphasis on the structural features of government agencies in relation to electronic provision of services; others place emphasis on the nature and evolution of government Web sites and corresponding services. Still, a few models consider the evolution of the use of information technology (IT) to facilitate the undertakings of government tasks. However, with the exception of the latter, the consensus emerges from the models that the development of digital government entails an evolutionary process starting with the creation of simple government Web sites for publishing information on the functions of government agencies. These simple Web sites further develop into sophisticated portal designs which correspond with the services provided, along with the levels of transactions with the users. The majority of the countries of the world are implementing e-government strategies and various assessments have categorized countries according to their stages of development based on the existing models. Apart from the brief description of the models, this chapter will also give examples of the levels of development of e-government services in different regions and countries.

## E-GOVERNMENT DEVELOPMENT MODELS

Scholars examining the characteristics of e-government strategies under implementation by government agencies have devised various models of e-government development. For example, Layne and Lee (2001) conceive a four-stage growth model for e-government development using local, state, and federal governments in the United States as points of reference. They refer to the first stage as cataloguing in which the governments develop Web sites for presenting information about their respective functions and services. The second stage, called transaction, allows online transactions with citizens, such as renewing licenses and paying various fines. This stage is also associated with enhancement of online interfaces within the internal structures of governments. Layne and Lee refer the third stage as vertical integration, which they describe as "local, state, federal governments connected for different functions or services of government" (p. 123), and the fourth stage, horizontal integration, as "integration across different functions and services" such as "the business being able to pay its unemployment insurance to one state agency and its state business taxes to another state agency at the same time because systems in both agencies talk to each other or work from the same database" (p. 125). According to this model, each stage is associated with the types of functionalities involved along with the technological and organizational challenges facing government agencies that are implementing e-government strategies.

Silcock (2001) reports six stages that governments go through both in their delivery of services to the citizens electronically and in their own internal communication. These are (1) information publishing and dissemination involving creation of Web sites for posting information on government functions and services, basically a one-way communication; (2) official two-way transaction, such as replacing letter-writing or phone calls with e-mail exchange; (3) multi-purpose portals, whereby a single portal provides links to various government departments, allowing citizens to get the kinds services they need; (4) portal personalization, allowing citizens to incorporate online features as needed; (5) clustering of common services in which portal designs allow citizens to perform transactions with different departments from one point; and, (6) full integration and enterprise transformation of which Silcock says "old walls defining 'silos' of services have been torn down, and technology is integrated still further to bridge the shortened gap between front and back office" (p. 90). Thus, this is an advanced stage of the fifth stage.

In a related model, Netchaeva (2002) provides a description of five stages: the first stage involves the various departments forming online sites that carry information corresponding to departmental functions. In the second stage, the sites develop some degrees of

interactivity such as e-mail exchanges with ordinary citizens, while in the third stage, according to Netchaeva, "users are given the opportunity to take part in forums and opinion polls" (p. 408). The fourth stage involves various degrees of online transactions for provision of government services such as car registration, license renewals, and payment of fines. The fifth stage entails a comprehensive and unified government portal with a range of complex services to the citizens.

Stowers (1999, 2004) offers three stages of e-government services as virtual bulletin board, the Web reaching out, and 24/7 service delivery. Stowers further reports a four-stage model proposed by Sood as presence (i.e., presence of government information), interaction, transaction, and transformation; as well as another four-stage model posited by the New Jersey Center for Governmental Studies as static, interactive, transactional, and transformational (Stowers, 2004). Reddick (2004) provides a two-stage model of e-government growth in connection to municipalities in the United States. According to Reddick, the first stage involves cataloguing of information online and applies to the relationship of government to citizen, while the second stage involves the completion of transactions online and applies primarily to the relationship of government to business. The latter is associated with the cities that have advanced levels of e-government implementation. Heeks (2002), like many other authors, considers the growth of e-government as an evolutionary rather than revolutionary process; but unlike such authors, his discussion implies that the growth of e-government did not start with the creation of government Web sites. Moreover, he views it in terms of two models of technology use: an old model and a new model. In the old model, information technology (IT) is employed for automating the internal tasks of government to process data (and this goes back to the advent of computers in the government structures). In the new model, according to Heeks, information and communication technologies (ICTs) are employed to support the external tasks of government through data processing and communication.

While many scholars advocate e-government growth models that have evolutionary patterns, some of the authors have cautioned about generalizing such patterns. For instance, Yong and Koon (2003) contend that no single development model fits entire e-government implementation, while Accenture (2003) has described a pattern that depicts the maturity of e-government through a series of plateaus, namely, online presence, basic capability, service availability, mature delivery, and service transformation (but looking closely at the model, one can realize that it is evolutionary in nature).

Perhaps the most extensive studies to determine levels of e-government development and associated implementation features of almost all the countries of the world are those of the United Nations' Department of Economic and Social Affairs (DESA), Division for Public Administration and Development Management (Formerly the United Nation's Division for Public Economics and Public Administration, UN-DPEPA). which categorizes the development of e-government into five main stages: emerging, enhanced, interactive, transactional and networked or fully integrated (UN, 2002, 2004). In the first stage (emerging), a country becomes an e-government player by establishing modest Web sites owned by individual government agencies for posting government and contact information. In the second stage (enhanced), the government's Web presence expands to include more Web sites and features such as the links to other agencies, features for searching and e-mail addresses. In the third stage (interactive), more features are incorporated for interacting with the citizens, while the fourth stage (transactional) entails more comprehensive and secure features for various online transactions, including digital signatures and passwords. The fifth and last stage (networked or fully integrated) is envisioned for complete integration of a government's Web resources, for instant access to (or delivery of) all services irrespective of the department.

One can clearly note that most of the above models of e-government development are closely related; they just differ in the level of detail employed to address the research questions of the authors. Based on common features of such models Kaaya (2004) has summarized the various models presented above into four main stages, starting from simple to sophisticated and interactive Web sites (Table 1).

## ASSESSING COUNTRIES ACCORDING TO E-GOVERNMENT DEVELOPMENT

It is worth mentioning that the UN-DESA's model (hereafter referred to as the UN model), with its corresponding benchmarking of nations of the world, has attracted the attention of researchers in this relatively new area of study and has thus emerged as a sort of a standard development model. For instance, Forlano (2004) has discussed the UNDESA's five stages of e-government development and provided an analysis of the e-government services of selected countries that correspond with each stage. The countries presented in Forlano's study include Botswana (emerging stage); Vietnam (enhanced); China, Estonia, India and Malaysia (interactive); and Brazil, Singapore, Mexico and UK (transactional). Likewise, Martin and Byrne (2003), as well as Panagopoulos (2004), have discussed and provided summaries the of the UNDPEPA's findings, while Mutula (2002) has analyzed

*Table 1. Development stages of e-government services*

| Stage | Characteristics |
|---|---|
| Stage 1: Web site creation | • Setting up of Web sites to provide information about structure, functions and services of a government agency information publishing and dissemination<br>• There might be links to related Web sites |
| Stage 2: Initial two-way interaction | • The Web site includes downloadable forms that can be submitted off-line<br>• There can be a two-way interaction between government officials and users via e-mail. |
| Stage 3: Online transactions | • The Web site supports some formal online transactions such as renewing driving licenses and filing tax returns. |
| Stage 4: Comprehensive government portals | • Supports one-stop transactions without the need for dealing directly with different agencies.<br>• Web design sophistications include improved gateway points coupled with security features. |

*Table 2. Categories of e-government capacities and examples of representative countries or regions (UN, 2002)*

| E-government capacity & development stage | Representative countries |
|---|---|
| **High** (Stages 3/4 of Table 1; Stage 4 of UNDPEPA's model) | Most developed countries plus such countries as Singapore, S. Korea, Brazil, Chile, Uruguay |
| **Medium** (Mostly stages 2/3 of Table 1; Stage 3 of UNDPEPA's model) | Several eastern European countries, Egypt and Malaysia |
| **Minimal** (Mostly stage 2 of Table 1; stages 2/3 of UNDPEPA's model) | Some of the former Soviet republics, several Asian countries, Costa Rica, India, South Africa and Nigeria |
| **Deficient** (Mostly stages 1/2 of Table 1; stages 1/2 of UNDPEPA's model) | Most African countries |

them in the context of Africa's Web content, and Kaaya, (2004) assessed the e-government services of the three East African countries using various attributes and established that their levels of development correspond with the second stage of the UN's model.

In 2002, 32 countries were in the emerging stage, 65 countries enhanced, 55 countries interactive, 17 countries transactional, and no country had achieved the fully integrated stage. There has been a gradual progress in the levels of e-government development over time. In 2003, 33 countries provided online transactional services (the fourth stage in the UN model) while the figure for 2004 is 38 countries.

Along with the five stages of e-government development, UN-DESA has developed an index, the E-Government Index, which benchmarks all of the United Nation's member countries according to their progress in implementing e-government services. The UN-DESA uses a number of parameters to calculate the E-Government Index. These include a Web presence measure that indicates the stages of government Web sites, and telecommunication infrastructure measures that define the ICT's capacity of individual countries. The infrastructure indicators include the internet hosts per determined number of people; the percentage of the population that has online access; and the percentage of the population with personal computers, telephone lines, mobile phones, and televisions. The UNDESA also uses a human capital parameter to determine the E-Government Index. This parameter employs the United Nations Development Programme's Human Development Index, the Information Access Index, and Urban/Rural Population Ratio as indicators. From the figures derived from the E-Government Index, countries are categorized into four groups according to their e-government capacities: high e-government capacity, medium e-government capacity, minimal e-government capacity, deficient e-government capacity. Examples are shown in Table 2 (examples randomly selected from each group or region).

According to the UN's 2002 benchmark, the countries with top e-government environments are USA, Australia, New Zealand and Singapore; these were closely followed by Norway, Canada, UK, and The Netherlands. These are classified to have transactional Web presence

*Table 3. E-government indices of top ten and ten other selected countries (UN, 2002)*

| Country | E-Gov't Index | Country | E-Gov't Index |
|---|---|---|---|
| USA | 3.11 | Chile | 2.03 |
| Australia | 2.60 | Nigeria | 1.02 |
| New Zealand | 2.59 | Egypt | 1.73 |
| Singapore | 2.58 | Costa Rica | 1.42 |
| Norway | 2.55 | South Africa | 1.51 |
| Canada | 2.52 | Malaysia | 1.63 |
| UK | 2.52 | Uruguay | 2.03 |
| The Netherlands | 2.51 | Kenya | 0.90 |
| Denmark | 2.47 | Brazil | 2.24 |
| Germany | 2.46 | India | 1.29 |
| **Global average** | 1.62 | | |

*Table 4. E-government readiness indices of top ten and ten other selected (UN, 2004)*

| Country | E-Govt Readiness Index | Country | E-Govt Readiness Index |
|---|---|---|---|
| USA | 0.9132 | Jamaica | 0.4793 |
| Denmark | 0.9047 | Fiji | 0.3912 |
| UK | 0.8852 | Egypt | 0.2653 |
| Sweden | 0.8741 | Germany | 0.7873 |
| Republic of Korea | 0.8575 | Israel | 0.6805 |
| Australia | 0.8377 | New Zealand | 0.7811 |
| Canada | 0.8369 | Japan | 0.7260 |
| Singapore | 0.8340 | Mauritius | 0.5055 |
| Finland | 0.8239 | Chile | 0.6835 |
| Norway | 0.8178 | Kyrgyzstan | 0.4468 |
| **Global average** | **0.4130** | | |

and high e-government capacity. Table 3 shows the top ten e-government-environment countries according to the indexes, and ten other selected countries from different regions (i.e., the regions without representative countries in the top-ten list; this applied to other comparison tables).

Lately, UN-DESA has published the UN Global E-Government Readiness Report which "assesses the 191 Member States of the UN according to a composite index of e-government readiness based on Web site assessment, telecommunication infrastructure and human resource endowment" (UN, 2004, p. 18; The difference between the "e-government index" and the "e-government readiness index" is difficult to determine because the measures used to devise the indices are similar). However, the latter focuses on potential environments for e-government implementation. Over 50,000 features of government Web sites were assessed. Along with the e-readiness index, the report provides values of Web measure and e-participation indices. According to the UN, the distinction between the two indexes is that, "Whereas the Web measure index assesses the availability of information and services online, the e-participation index measures 'how useful' are these services and frequently they appear. In particular, the index attempts to qualify if these tools and materials are conducive to the online deliberative and participatory process between the government and the citizen" (p. 65). Top ten countries according to their e-government readiness index are shown in Table 4, while Table 5 and 6 show top e-participation and Web measure scorers respectively. The indices of ten other selected countries from different regions are shown for comparison.

*Table 5. E-participation index of top ten and ten other selected countries (UN, 2004)*

| Country | E-Particip. Index | Country | E-Particip. Index |
|---|---|---|---|
| U. K. | 1.0000 | Estonia | 0.639 |
| United States | 0.9344 | Colombia | 0.6230 |
| Canada | 0.9016 | Belgium | 0.6066 |
| Singapore | 0.8361 | Philippines | 0.3607 |
| Netherlands | 0.8033 | Turkey | 0.2951 |
| Mexico | 0.7705 | Pakistan | 0.1639 |
| New Zealand | 0.7705 | Mauritius | 0.1475 |
| S. Korea | 0.7705 | China | 0.0820 |
| Denmark | 0.7377 | Jamaica | 0.0492 |
| Australia | 0.6721 | Fiji | 0.0328 |

*Table 6. Web measure index of top ten and ten other selected (UN, 2004)*

| Country | Web measure Index | Country | Web measure Index |
|---|---|---|---|
| United States | 1.000 | Sweden | 0.772 |
| U. K. | 0.973 | New Zealand | 0.741 |
| Singapore | 0.969 | Japan | 0.629 |
| S. Korea | 0.946 | Chile | 0.884 |
| Denmark | 0.934 | Israel | 0.691 |
| Chile | 0.884 | Mauritius | 0.544 |
| Canada | 0.873 | Argentina | 0.643 |
| Australia | 0.830 | Jamaica | 0.409 |
| Finland | 0.807 | India | 0.568 |
| Germany | 0.795 | Estonia | 0.699 |

All the indices and other measures show the United States to be the top e-government—environment country (on only one index, e-participation index—which is derived qualitatively—the United States is second to the United Kingdom). Its e-government portal, Firstgov, is considered to be the most advanced in the world in terms of the technological aspects of e-government development and implementation strategies (Abramson & Means, 2001; CBO, 2002; Fletcher, 2004; Ho, 2002; Stratford & Stratford, 2000, UN 2004) coupled with top policy support strategies (Relyea, 2002; Relyea & Hogue, 2004). The UN reports that the Web site gets about 6 million visitors per month and is a gateway to over 180 million other (federal and state) government Web sites. Further, in terms of the UN's scores of the percentage utilization of stages of e-government, the United States scored 100% for stages 1-3, and 92.7% and 77.8% utilization of stages 4 and 5 respectively (UN, 2004), again making the U.S. the top country in achieving the advanced stages of e-government with an overall average of 94.5%. In other words, there remain only 5.5 percentage points for the U.S. to achieve fully integrated or networked (seamless) stage of e-government development. The U.S. government enacted the E-Government Act in 2002.

The UK government has also been instituting the "UK Online" campaign since 1999 (Bennett & Cirell, 2003; Devargas & Marshall, 2002; Grimshaw, 2003; Gunter, 2004; Ranger, 2002; Silcock, 2001) by challenging its public sector bodies "to modernise and achieve citizen-centred services—to integrate policies and programmes, to 'join-up' service delivery across departments and agencies, to harness the potential of information technology, to value the ideals of public service and get the best out of staff" (Silcock, p. 91). As a result, the UK has made great progress in implementing e-government strategies, and it is second to the U.S. in achieving the advanced stages of e-government development. Its scores in terms of percentage utilization of development stages is 100% (stage 1), 97.7% (stage 2), 94.0% (stage 3), 92.7% (stage 4) and 77.8% (stage 5), with an overall average of 92.0%. Together with the USA and UK, there are 16 countries in the world that are categorized within High Range scores

*Table 7. E-readiness of select countries (McConnell International, 2001)*

| Low E-Readiness | | | High E-Readiness |
|---|---|---|---|
| 1st Tier countries | 2nd Tier countries | 3rd Tier countries | 4th Tier countries |
| Turkmenistan, Turkey, Kazakhstan, Slovakia, Russia, Ecuador, Romania, Kenya, Poland | Bangladesh, Kuwait, Ghana, Ukraine, Czech Republic, Sri Lanka, Slovenia, Bolivia, Columbia, Senegal, Malaysia, Saudi Arabia, Lebanon, Bulgaria, Hungary | South Africa, Nigeria, Morocco, Pakistan, Costa Rica, Panama, Jamaica, Lithuania, Tanzania, Egypt, Philippines, Greece, Latvia, Thailand | India, Indonesia, Venezuela, Vietnam, Jordan, Argentina, Estonia, China, Taiwan, UAE, Peru, Mexico, Chile, Brazil, Korea |

by stages; the percentage utilization of high range category is 67-100%. The other categories are Mid Range (34-66% utilization) with 48 countries, and Low Range (0-33% utilization) which has 114 countries (see UN, 2004, for details). Thirteen member nations of the UN do not have a government Web presence. By region, North America is the most advanced region of e-government development followed by Europe while Africa is the least advanced and other regions are in the middle.

Other studies have assessed various countries to determine their status in their capacity to make use of ICTs for various activities including e-government services. For example, the McConnell International assessed e-readiness of 53 countries—excluding most western nations--defining "e-readiness" as "the capacity to participate in the networked world" (McConnell International, 2001). Accordingly, the main attributes of e-readiness were considered to be connectivity, e-leadership, information security, human capacity, and e-business climate. The study ranked those countries into four tiers from low e-readiness to high e-readiness (Table 7).

With some few exceptions (e.g., India, which appears to have minimal e-government capacity but with high e-readiness), these categories compare well with the UN's benchmarking results (Tables 2-6). Differences might be due to differences in assessment techniques (the UN used Web site and survey data while the McConnell International used a group of workshop participants representing the assessed countries).

## LOOKING FORWARD AND CONCLUSION

The majority of the countries of the world are implementing e-government strategies at different stages of development, ranging from advanced and sophisticated stages in developed countries to simple dissemination of government information in many developing countries. Investigating the development of e-government strategies is a relatively recent addition to the ever growing areas of research, and scholars in this area generally agree that the development of e-government is an evolutionary process. Various assessments of evolving e-government strategies have generated different but related models showing stages of e-government development, ranging from two to six stages. Why should there be different models? In this chapter, it was speculated that different models emanate from the scholars' places of emphasis (such as government structures and corresponding services, the nature of government Web sites, and the use of IT in the government systems irrespective of the existence of the Internet), as well as the research questions these scholars want to address. There are also various measures employed by different researchers to assess the performance of e-government strategies. There is, therefore, a need at this juncture for the scholars in this area to establish common criteria that can be used to determine the stages of e-government development together with the performance and subsequently the impact of e-government strategies. The model and measures developed by the UN's Department of Economic and Social Affairs (UN, 2002, 2004) is a promising start but there is a need for its methodological reports to be more explicit. Abramson and Means (2001, p. 14-15) have also suggested 13 steps to be followed when benchmarking Web-based service delivery as a policy and management tool.

The findings of the various studies (notably, e-government index/e-government readiness index, e-participation index, Web site scores, percentage utilization scores, etc.) have revealed that many countries have made great efforts in reaching out to their citizens through e-government implementation strategies. Only African countries are far behind in all of the measures reported. The findings are a wake up call for those countries that have not reached the advanced stages of e-government to face

the challenges of realizing potential benefits of implementing e-government strategies.

There are also joint efforts for e-government implementation through regional groupings such as the ASEAN countries (Holliday, 2002), but especially the EU countries, that seek to support their members in their endeavors to improve government performance through effective delivery of and access to government services by their citizens. Martin and Byrne (2004) have discussed the various public strategies for achieving the information society in the EU. The international and intergovernmental organizations such as the UN agencies and the World Bank are striving toward similar goals (see also the chapters on regional cases for more joint initiatives).

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## KEY TERMS

**E-Government Index:** An indicator of the progress the UN member countries have made in implementing e-government strategies (uses almost the same measures as e-government readiness index).

**E-Government Readiness Index:** A quantitative composite measurement of the capacity and willingness of countries to use e-government for ICT-led development. Along with an assessment of the Web site development patterns in a country, the e-government readiness index incorporates the access characteristics, such as the infrastructure and educational levels, to reflect how a country is using the ICT opportunity for national, economic, social and cultural empowerment of its people (UN, 2004).

**Emerging Presence:** The first stage of e-government development in which a country becomes an e-government player by establishing modest Web sites owned by individual government agencies for posting government and contact information (UN Model).

**Enhanced Presence:** The second stage of e-government development whereby the Web presence in a country expands to include more Web sites and features such as the links to other agencies, features for searching and e-mail addresses (UN Model).

**E-Participation Index:** The e-participation index assesses the quality, relevance, usefulness and the willingness of government Web sites for providing online information and participatory tools and services to the people (UN, 2004).

**E-Readiness:** The capacity to participate in the networked world (McConnell International, 2001).

**Interactive Presence:** The third stage of e-government development whereby more features are incorporated for interacting with the citizens (UN Model).

**Percentage Utilization of Development Stages:** Indicates the extent to which a country makes use of each stage of e-government development.

**Seamless or Fully Integrated/Networked Presence:** The fifth and last stage of e-government development, providing complete integration of government's Web resources for instant access to all services irrespective of the department (UN Model).

**Transactional Presence:** The fourth stage of e-government development incorporating more comprehensive and secure features for various online transactions, including digital signatures and passwords (UN Model).

**Web Measure Index:** A composite index measuring features of government presence online.

# Different Types of Information Warfare

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## INTRODUCTION

Information warfare (IW) has recently become of increasing importance to the military, the intelligence community, and the business world. The purpose of many actors, like decision makers, military advisers, non-governmental actors, or business people, is to facilitate an understanding of information warfare with reference to both military and civilian life (e.g., Huhtinen & Rantapelkonen, 2002; Kaldor, 2001).

According to James Der Derian (2003), information warfare has become the umbrella concept for understanding cyberwar, hackerwar, netwar, virtual war, and other technological network-centric conflicts. Many of these concepts associate technology and digital equipment and refer to a specific kind of computer technology. But these concepts are also connected to the definition of conventional conflicts and warfare. The question of conflict or warfare is not only physical, but also a psychological issue. For example, the terrorist group would hit the automated teller machine systems (ATM) and steal the money of private people. The damage would be very small technically but the influence of psychological behaviour could have a long effect. The ATM systems work perfectly and safely after the damage has been done but people no longer want to use it because of bad rumours.

Military operation other than war (MOOTW) has a history that goes back at least as far as Sun Tzu, who considered defeating an enemy without violence to be the "acme of skill" in warfare. Asymmetric, non-linear model of war underline the capability of perception and fast influence. The idea of avoiding open linear contact with the enemy and trying to seize the initiative to strike is the revival of the art of war. (Der Derian 2003, p. 453) Information warfare is concept of information society conflicts and threats. Information warfare means the use of information or information technology during a time of crisis or conflict to achieve or promote specific objectives over a specific adversary or adversaries. Cyberwar is an assault on electronic communication networks.

"The POST-COLD WAR paradigm for U.S. forces in combat and in military operations other than war (MOOTW) is increasingly a nonlinear battlespace where brigades and battalions conduct independent operations in assigned sectors. In postcombat and peace-support operations, nonkinetic/nonlethal means are often the main effort. The new paradigm is changing the way the Army plans, coordinates, executes, and conducts information-operations (IO) and IO-effects assessment at brigade and below." (Tulak, Broome, & Bennett, 2005)

The action of information warfare is defined as information operation (IO). Information operation can be divided into offensive IO (e.g., computer network attack, command and control warfare, special information operations), civil affairs, public affairs (media warfare), and defensive IO (e.g., physical security, computer network defense, and counter propaganda) (Huhtinen & Rantapelkonen, 2002). Information superiority means the simultaneous joint operation with all aspects of information operation. For example, the lack of defensive IO aspect can put at risk offensive IO. Without civil affairs of public affairs capabilities there are risks at achieve success in offensive and defensive IO. Media is one of the most important parts of modern warfare.

## BACKGROUND

Information warfare is not a new phenomenon, but it has been there from the beginning of human society. The effectively of information warfare has drastically increased along the emerge of global information and cyber space. The theory of information warfare is based on the laws of physics, interaction of and within societies, principals, means, and tools that enables one to gain information superiority over opponent. Information warfare is waged both during peace and war. The base of information warfare is created with psychological warfare, deception, and operation security. (Huhtinen & Rantapelkonen, 2002)

Information warfare has two main types. The first one is psychological warfare like media war and perception management, which can also be called the "soft" part of information warfare. The second is net warfare like computer or electronic warfare. The goal of information warfare is information superiority and securing the information system from an enemy or target. Cyberwar as a type of information warfare can define the high-technological warfare in cyberspace and mainly with machine-based warfare. One example is satellite reconnaissance.

The information revolution mainly means digital technology is available to more and more common people. There are two main arguments. The first one is that the information revolution has extended economic and political freedom expanding the world's democratic core. The second one is that computer technology is primarily a supporter of conservatism in government. These two contradictory arguments have brought about significant changes in the conduct of warfare, giving the United States, with its lead in information technology, a great advantage in international relations. So-called "roughly stated" information technology can help those who master it to win large wars at long distances with small forces. Rogue states are likely to turn to asymmetric strategies, for instance, weapons of mass destruction, terrorism, and information operation attacks against the United States and its partners.

For example, in March 2003, we had the opportunity to follow the U.S. attack on Iraq in real time online and on television. "The shock and awe" strategy had been taken into use the one example of information operation. According to its creator Harlan Ullman, it was important that the United States take control of the observations made by the states belonging to the Axis of Evil (Iraq, Afghanistan, North Korea), create a fear of these states' vulnerability, and emphasize the superiority and invulnerability of the United States. A good metaphor is a room into which the Iraqis have been locked in while the United States turns the lights on and off according to its desires. The whole idea was achieved by information superiority goal (e.g., Franks 2004)

## INFORMATION SUPERIORITY AND PERCEPTION MANAGEMENT

The authorities, researchers, and intelligence workers are interesting in outer space, human brains, human imagination, and artificial intelligence (AI) (Baudrillard, 2002). Gilles Deleuze wrote how our reality changes towards the TV studio where we can be the audience, the producer, and the movie star at the same time. The world itself changes movies (Deleuze 1995, p. 72). In the book "*Imagewars. Beyond the Mask of Information Warfare,"* we argued that life is full of paradoxes. They are everywhere: in politics, business, science, and war (Huhtinen & Rantapelkonen, 2002, p. vii). Rantapelkonen interpret the concept of war machine according to the thinking of Paul Virilio and James Der Derian. In his article "The War Machine, Dromology and Iraq War II" Rantapelkonen sees that Der Derian's concept of "military-industrial-media-entertainment (MIME)" network is an extension of the concept of "revolution of military affairs" (RMA). This MIME network runs on videogame imagery, twenty-four hour news cycles, multiple nodes of military, corporate, university, and media power. It is like havens a dream-machine and a horror-machine in one (Rantapelkonen, 2005).

Contending that access to lack of information today is just as crucial as possession of petroleum and ammunition. For example, there are closed circles within information, electric current, and the computer. The pump of petroleum needs electric current and without a computer you cannot direct information you need to pumping petroleum. Without electric current you cannot use computers. The cyberthreat posed by "almost invisible computer assailants" to a nation's power grids, transportation networks, financial systems, and telephone exchanges. Media (e.g., TV and Internet) is the one of the most important parts of information warfare. Superpower states military exercises have involved actions that elevate information warfare from a tactical level to a strategic level. Information warfare involves a new kind of battlefield but with the potential for equally as many casualties. Information warfare does not have the same lethally as classical weapons, but it can be neutralize as lethally (Rampton & Stauberg, 2003).

We assume that in democratic countries the media are not easily controllable and cannot easily be used as an instrument of war. Artz emphasizes that global companies own and control the media that creates spectators and consumers rather than informed citizens. Economical, political, and cultural leadership act neither with unlimited power nor simply through manipulation, but rather with widespread consent arising from the "common sense" of everyday life that has been institutionally organized. (Artz, 2005, p. 9) False beliefs about everyday lives are more dangerous to people than terrorists or criminals. Artz argues that the media–government–popular culture model encourages "Western" countries to understand individual actions as they are institutionally and culturally played out in the daily lives of working people as citizens, students, and soldiers. More dramatically, this model posits that our contemporary culture of spectatorship grounds the legitimacy of government actions and "our way of life." (Artz, 2005, p. 10)

The so-called "militainment" of society has a long tradition in cooperation between media and government. Actors and artists have visited troops since World War I. For example, NATO has a special budget for what is called "morale and welfare activities." The aim is to make the audience familiar with the situation of soldiers training and going to battle, to make the viewers get involved in military thinking and behaviour, and to lose distance from weapons and the force of arms. (Thomas & Virchow, 2005, p. 29-32)

According to Jansen, in 2003, for example, the U.S. government spent $600 million on public diplomacy programs intended to enhance its image abroad; it spent an additional $100 million directly targeting the Middle East through the Middle East Partnership Initiative; and it spent $540 million on international broadcasting, Voice of America, Radio and TV Marti, Radio Free Europe/Radio Liberty, Radio Free Asia, Worldnet, Radio Farda, and Radio Sawa. These figures do not include funding for U.S. military and intelligence networks' resources dedicated to information warfare, including psychological operations and "counterinsurgency" campaigns (Jansen, 2005, p. 51).

In the information warfare, war is experienced through television, internet and newspapers as a real time representation that has a new kind of effect on media consumers. In information warfare, those who experience the war are an unspecified extensive audience that is not touched by time- and place-specific war. Every day we have to look at the theater of war, burning cars, destroyed homes, homeless people, and humiliated prisoners, even if we seem to have nothing whatsoever to do with the war. With sovereign power, the media presents pictures of and viewpoints on war without the audience having an opportunity to communicate.

Information warfare works for the private and restricted communication of authority and government. The other aspect of information warfare is the perception management of peoples' "open" communication networks. The mass media is not a neutral, fully autonomous subsystem of society; it is closely linked to both the political and economic systems. It opens a new world but at the same time it makes relatively everything. They shape public opinion and are shaped by external social interests. Mass media is a territory of propaganda warfare; they compete for steering public opinion into certain directions. (Fuchs, 2005, p. 206)

## THE CYBERSPACE AND CYBERWAR

Der Derian describes (Der Derian, 2003, p. 441) how the digital age came to enjoy a natural hegemony over other descriptors of modernity. When we speak the digital age, we speak the same time digital war, information warfare, or cyberwar. Cyberwar means that we focus on the threat and possibilities of space, information technology, and network. According to Derian, although the digital age might stretch in the United States from Silicon Valley to Alley and globally from Bangalore to Singapore, the distinguishing characteristic of the digital age is a spatio-temporal intensivity rather than a geopolitical extensivity. The digital age as a spatio-temporal intensivity means high frequency and density in area while a geopolitical extensivity means an enlargement of areas. The global networking of multimedia has become unstoppable. (Der Derian, 2003, p. 442-445). Multimedia is one form of information. Multimedia is a key source of our worldview, for example how we stand on war and violence. Security is not a fact but feeling. Terrorism is not a new threat but we think about it more and more thanks for media and news. "In times of terror," when everyone is something of a conspirator, everybody will be in a situation where he has to play detective. Der Derian speaks about "global heteropolar matrix," in which different actors are able to produce profound global effects through interconnectivity (Der Derian, 2003, p. 451).

The technologically network-based understanding has become increasingly important to common "Western" people but also to government officials and military decision makers. Of course, the technology and digital network-based culture is obviously the main target of terrorist groups. The western public audience creates its feelings of security through the global media and that is why terrorism has become so important role of western world in the new threat (Baudrillard, 2002; Borradori, 2003).

## THE FUTURE TRENDS

The military leadership is well aware of the value of all kinds of cultural and social activities. For example, computer games are of the most popular leisure activities in many countries, and war games have a significant share of the market. The ego-shooter *Operations*, which 1.2 million copies had been distributed for free, is not only game the U.S. Armed Force uses for recruitment. America's Army is downloadable from the Internet free of charge, but the track the progress a player makes in the career training that he or she has chosen (Thomas, 2005, p. 29-32).

One reason the information warfare expansible situation is that we have a strong technological understanding of warfare and the role of the warrior. Soldiers have increasingly lost their "warrior existence." In "instrumentalizing" war as much as it has, the West has reached a point at which it no longer understands the expressive element. Instead, it tends to dismiss it as "irrational," "evil," "barbaric," or "senseless." The trouble is that we have no way of understanding a totally different understanding of warfare, like terrorism. (Coker, 2002)

The trend that war has become computerized has slowly changed soldiers' physical relationship with their work. To an increasing extent soldiers no longer "physically" work, but sit in front of computers and keep an eye

on the battle with different icons. The enemy is an icon on the screen. Of course, on the ground, the common soldiers use traditional and conventional weapons and conventional vehicles. But there are too new elements like media and high technological command and control systems. The soldiers of the United States have been forced to do police duty in combat gear and they are being killed. In this police duty-system, soldiers' lives and the whole readiness of the armed forces have been placed at great risk (Sennett, 2003).

Information warfare relate to the traditional war can understand also how we use the word of war. The concept of war is also present in language and war is created by texts and pictures in media. Especially, the metaphors of the language of scientific and economic experts are old concepts of military strategy. Audiences have adjusted to the war against terrorism and its phenomena just as the people of earlier generations adjusted to the forms of warfare in their era. The concept of war also presents clear solutions to the social challenges of the culture of each era. The difficulties of diplomatic activity and the aimless problem solving of democracy are increasingly challenged by clear "win or lose" thinking. The alternative to peace is a viscous, endless process in which the quick model to quick thoughts offered by war receives more and more attention in western thinking. Its speed is supported by the information technological infrastructure.

## CONCLUSION

In this study, I try to describe different types or aspects of information warfare. The concept of information war is expanding from the traditional concept of war. Nowadays, there are wars against terrorism, independence wars, liberation and civil wars, justified wars, drug wars, preventive, economic, and oil wars. On the other hand, the Second World War and Cold War are outdated concepts for describing organized violence. As a newcomer in the field of concepts that describe war, terrorism inspires discussion for and against it. In background of all kind of wars there is the idea of network. When the world globalizes more and more and become depended on technology the concept of information warfare is useful to understand future threats and conflicts.

For example, the enemy in the information warfare will be mostly invisible and networked. Machines, computers, and "cyborgs" could play an important role in information warfare. Characteristic to the network is that it is loose and can be broken apart and put together again very quickly. Therefore, it is possible to get involved quickly, too. This way the organizational structure itself feeds a constant chase with no end in sight. Earlier the enemy was defined and static.

It is customary to network combat that power is concentrated without the concentration of power. Because of information systems both sides to a conflict can keep an eye on each other and it is almost impossible to evade electronic detectors. This is how power becomes concentrated without the concentration of power (Sennett, 2003, p. 55-56).

Video surveillance, electronic identity cards, and gated communities are the future that is already here. The information age leaves us to wonder whether we are on the inside or the outside of these new invisible boundaries. How would we know?

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## KEY TERMS

All terms were obtained from http://www.wordreference.com/definition/cyberwar

**Asymmetric Strategies:** Characterized by asymmetry in the spatial arrangement or placement of parts or components.

**Cyberwar:** An assault on electronic communication networks.

**Cybernation:** The control of processes by computer.

**Cyberspace:** A computer network consisting of a worldwide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange.

**Information Operation (IO):** Information Operation can be divided into Offensive IO (e.g., computer network attack, command and control warfare, special information operations), civil affairs, public affairs (media warfare) and defensive IO (e.g., physical security, computer network defense, and counter propaganda).

**Information Warfare:** The use of information or information technology during a time of crisis or conflict to achieve or promote specific objectives over a specific adversary or adversaries; "not everyone agrees that information warfare is limited to the realm of traditional warfare."

**Interconnectivity:** Be interwoven or interconnected; "The bones are interconnected via the muscle."

**Military Operation Other Than War (MOOTW):** Has a history that goes back at least as far as Sun Tzu, who considered defeating an enemy without violence to be the "acme of skill" in warfare.

# The Digital Citizen



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## INTRODUCTION

The objective of this article is to sketch out the profile of the digital citizen. The premise for this article rests upon utopian views that embrace new media technologies as democratizers of postindustrial society (e.g., Bell, 1981; Johnson & Kaye, 1998; Kling, 1996; Negroponte, 1998; Rheingold, 1993) and cautionary criticism that questions the substantial impact new media could have on reviving a dormant public sphere (e.g., Bimber & Davis, 2003; Davis, 1999; Hill & Hughes, 1998; Jankowski & van Selm, 2000; Jones, 1997; Margolis & Resnick, 2000; Scheufele & Nisbet, 2002). Concurrently, declining participation in traditional forms of political involvement and growing public cynicism (e.g., Cappella & Jamieson, 1996, 1997; Fallows, 1996; Patterson, 1993, 1996) position the Internet and related technologies as vehicles through which political activity can be reinvented. Still, conflicting narratives on civic involvement, as articulated by the government, politicians, the media, and the public, create confusion about the place and role of the citizen in a digital age. The digital citizen profile, therefore, is defined by historical and cultural context, divided between expectation and skepticism regarding new media, and presents hope of resurrecting the public sphere and awakening a latent, postmodern political consciousness. This article outlines these conditions, reviews perceptions of the digital citizen, and proposes a digital citizen role model for the future.

## BACKGROUND

Any discussion of political consequence new media is preceded by discussion of the following four predominant and overlapping trends in civic participation, as presented in relevant research: (a) nostalgia for past forms of political engagement, articulated within public sphere rhetoric; (b) the aggregation of public opinion within representative democracy models; (c) the growth of public cynicism and disillusionment toward politics and the mass media; and (d) declining civic participation through formal channels of political involvement.

First, retrospective examinations of public engagement frequently evoke the ideal of the public sphere, as articulated by Habermas (1989), who viewed the public sphere as a domain of our social life in which public opinion could be formed out of rational public debate, leading to public agreement and decision making, thus epitomizing democratic tradition. According to this view, mass media have rendered these forms of democratic involvement in politics extinct. Critics of the Habermasian viewpoint argue that anarchy, individuality, and disagreement, rather than rational accord, lead to true democratic emancipation (Lyotard, 1984). They also find that Habermas's examples of past, romanticized public spheres excluded women and nonpropertied classes and propose a postindustrial model of coexisting public spheres or counterpublics, which form in response to their exclusion from the dominant sphere of debate (Fraser, 1992). These multiple public spheres, not equally powerful, articulate, or privileged, exist and give voice to collective identities and interests. Schudson's (1998) reviews of political activity reveal that the evidence a true ideal public ever existed is sparse, and that public discourse is not the soul of democracy, for it is seldom egalitarian, may be too large and amorphous, is rarely civil, and ultimately offers no magical solution to problems of democracy. Perhaps it is more meaningful to view the public sphere as an impossible ideal worth striving toward, rather than an extinct form of political interaction.

Second, congruent to the demise of the public sphere in modern society is the trend to aggregate public opinion. Several conditions associated with the postindustrial condition, especially mass society, urbanization, and the orientation of mass media have led government, politicians and the mass media to rely on aggregations of public opinion obtained through polls. This trend, which Herbst (1993) refers to as "numbered voices," exchanges the individuality, detail and authenticity of personal opinion on public affairs for a concentration of opinions that fit into predetermined question and answer sets reported in aggregation. The tendency to group and categorize public opinion, therefore, limits the opportunities and the scope of discussion on public affairs, as citizens are not called upon to deliberate, but merely to report agreement or disagreement with certain questions. This phenomenon compromises the depth of the public sphere and restricts civic involvement with public affairs.

Third, a parallel development of growing public cynicism and disillusionment with politics and the mass media

keeps citizens from becoming actively involved with public affairs. Research conducted on the effects of cynicism consistently reveals that cynical language employed by politicians and the media, as well as the tendency to focus on discussing/reported insider goings-on instead of important issues, leads skepticism about the impact political, media, and citizen action could have on improving public affairs (e.g., Cappella & Jamieson, 1996, 1997; Fallows, 1996; Patterson, 1993, 1996). As the prospect of civic participation influencing governance appears grim and as this skepticism is reinforced through negative or cynical coverage in the mass media, growing cynicism spreads in a spiraling manner (Cappella & Jamieson, 1996, 1997).

Fourth, all these trends are reflected in growing reluctance to participate in politics through formal or conventional channels of civic engagement, such as voting, community involvement, and volunteering. Despite the fact that the modern public sphere attempts to not draw distinctions based on gender, class, or race, the democratic model practiced in modern societies leaves little room for citizen involvement. Representative democracy, the prevalent mode of democracy at present, allows citizens to elect officials who deliberate and make decisions for them. Efficacy of governance in a mass society is thus secured, but public deliberation of civic affairs is compromised. Compounding forces place additional restrictions. Carey (1995), for instance, argued that the privatizing forces of capitalism have created a mass commercial culture that has replaced the public sphere. Putnam (1996) attributed the disappearance of civic America to the omnipresent television, suggesting that television occupies all time previously devoted to civic affairs and induces passive outlooks on life. Hart (1994) argued that some media, such as television, "supersaturate viewers with political information," and that as a result, "this tumult creates in viewers a sense of activity rather than genuine civic involvement" (p. 109). In the same vein, in a striking comparison of civic disengagement among over the past 30 years, Delli Carpini (2000) described young Americans as less trusting, less interested in politics or public affairs, less likely to feel a sense of obligation associated with citizenship, less knowledgeable about the substance and processes of politics, less likely to read a newspaper or watch the news, less likely to register to vote, less likely to participate in politics beyond voting, less likely to participate in similarly minded community organizations, and less likely to engage in traditional forms of civic engagement.

Within this context, new media are viewed as vehicles through which these conditions can be amended. For instance, the Internet could serve as a virtual sphere or revive the public sphere, provide a forum through which individual, not numbered, voices can be heard, host political discussion that focuses on issues and not strategy, and encourage deliberative or direct models of democracy. Digital media, including the Internet, set the state for a digital citizen to function, a stage in which several of shortcomings of past modes of civic participation can be overcome.

## THE DIGITAL CITIZEN

As an entity in modern society, the digital citizen is defined and reified through his/her use of digital media. This means that the digital citizen observes, monitors, and becomes involved in civic affairs through digital media and implies that the digital citizen can be both empowered and restricted through use of digital media. The Internet, the primary medium for this type of citizen, as it converges and sustains several operative digital technologies, becomes an asset or a detriment, depending on how it is put to use.

While the Internet and surrounding digital technologies provide a public space for the digital citizen to function, they do not necessarily provide a public sphere. The possibility of information access enabled by emerging media has not been associated with increase in political participation or civic engagement (Bimber, 2001), and has not been identified as a factor in reducing voter cynicism (Kaid, 2002). Moreover, entertainment uses of the Web tend to prevail over more informational ones, and do not generate substantial social capital (Althaus & Tewksbury, 2000; Shah, Kwak, & Holbert, 2001). A new public space is not synonymous with a new public sphere, in that a virtual space simply enhances discussion; a virtual sphere should enhance democracy.

As a virtual public and political space, the Internet is plagued by lack of universal access, discussion that sometimes unites and often divides further, and growing commercialization that threatens to marginalize alternatives uses of digital media. The advantages of the Internet as a public space can be enjoyed only by the select few who have access to it, thus harboring an illusion of an open public sphere (Pavlik, 1994; Williams, 1994; Williams & Pavlik, 1994). While digitally enabled (Abramson, Arterton, & Orren, 1988; Grossman, 1995; Jones, 1997; Rash, 1997), this citizen operates within an online sphere that reproduces the class, gender, and race inequalities of past public sphere incarnations (Hill & Hughes, 1988). Discussion online also bares the potential of connecting citizens or further emphasizing insurmountable differences (e.g., Mitra, 1997a, 1997b; Schmitz, 1997), and can suffer from the same conditions present in traditional media or forms of involvement. Specifically, digital citizens may express opinions online, and do so loudly, but

that does not necessarily result in discussion of greater substance or political impact (Jones, 1997; Poster, 1995; Schement & Curtis, 1997). Finally, the Internet is rapidly becoming more of an online shopping arcade and less of a deliberative space, which influences the orientation of digital political discussion. As a medium constructed within a capitalist context, it bears the architecture to resist commercialization but is also susceptible to it (McChesney, 1995; Newhagen & Rafaeli, 1996), thus unable to "produce political culture when it does not exist in society at large" (McChesney, 1995, p. 13). Not only is the content featured online not innovative enough or distinct from that feature in other mass media, but the sheer volume of information available online fails to capture the attention of the average citizen in the manner traditional mass media do (Bimber & Davis, 2003; Margolis, Resnick, & Tu, 1997; Scheufele & Nisbet, 2002). Moreover, the Internet as a mass medium is susceptible to the same type of control and commercial concerns that normalize the content of traditional media (Davis, 1999; Margolis & Resnick, 1997), thus reinforcing, rather than challenging the existing political culture (Margolis, Resnick, & Tu, 1997).

So, who is the digital citizen? A citizen enabled by technologies that carry both promise and bias, thus compromising the potential of the digital citizen. Moreover, this citizen also functions within a political system not equipped to sustain the direct democracy uses new media encourage. Within the prevalent mode of representative democracies, the free-flowing and robust online deliberation possesses no channel of being directed to governing officials. As Melucci (1994) argued, "the ceaseless flow of messages only acquires meaning through the code that order the flux and allow its meanings to be read" (p. 102). Similar research conducted by Jankowski and van Selm (2000) indicated that online discussions seemed to be dominated by elites and seldom extended to the off-line sphere of interaction.

And how does the digital citizen function within this compromised environment? On the one hand, the digital citizen is summoned by the power structure to enter the sphere of governance in limited ways that mimic traditional forms of civic engagement. Based on research accumulated by the Pew Internet and American Life Project, citizens are increasingly drawn to digital media, and attracted mostly to interest group and nonpartisan Web sites (Cornfield, Rainie, & Horrigan, 2003). Thus, the Internet does still bear some promise on attracting activity that challenges the mainstream flow of political information. Still, politicians and the media are limited in how they engage the digital citizen, in that they employ digital media mostly to conduct political research, enhance two-step flow communication with other media and opinion leaders, invite donations to political causes, and publicize news releases and endorsement (Cornfield, 2004). Digital citizens, on the other hand, express frustration at failing to locate the information they are seeking online, enjoy participating in online polls and circulating political jokes and cartoons, but are not drawn to conventional formats of political content online (such as news releases and endorsements) (Cornfield, Rainie, & Horrigan, 2003). Digital citizens still prefer Web sites of major media outlets or TV for information on public affairs over Internet-based news organizations (Kohut, 2003). These compounding orientations reveal that digital citizens enter virtual space seeking new forms of political involvement and to exert political influence. The prevalent political structure, on the other hand, is not equipped or reluctant to sustain such modes of deliberative, two-way communication.

Uses of digital media by politicians and the media that are one directional and do not sustain feedback channels for the digital public, present less meaningful, and thus less inviting ways for citizens to become politically involved. At the same time, it is substantive involvement that restores faith in the efficacy of civic involvement and challenges growing cynicism (Delli Carpini, 2000), leading to the conclusion that is not the quantity, but rather the quality of online involvement, that could potentially influence civic engagement. Recent research supports this assertion, indicating that it is generally the nature of online deliberation that tends to support medium uses that generate social capital, revive civic engagement, and could contribute to public sphere regeneration. For instance, recent research has shown that Internet users are aware of and expose themselves to a wider variety of arguments, including ones that challenge their own preferred candidates and positions, thus lending support to a public sphere that supports accord and dissention. Specifically, online users who attended or participated in Web deliberative groups possessed greater argument repertoire, a concept defined as "the relevant reasons that one has for one's own opinions and the relevant reasons that others with opposite opinions might have" (Cappella, Price, & Nir, 2002, p. 73). Similarly, additional research documents that, while Internet hard news use has a positive main effect on political activity, this influence is mediated by face-to-face and online political conversations (Hardy & Scheufele, 2005). The effect of the Internet, as an independent factor, is frequently moderated by past and present political habits that the individual sustains (Jennings & Zeitner, 2003), thus revealing a modest and integrative, rather than radical, impact for digital media upon the routines of the digital citizen. Raise awareness and participation, but not necessarily a sense of collective identity, that we could term the digital citizen.

## CONCLUSION

Therefore, the digital citizen is equipped, but not shaped by emerging digital media. Schudson's (1998) model of the monitorial citizen seems to fit the digital landscape well, in that he argues that in modern times, citizens are mischaracterized as inactive or uninformed and should be viewed as existing within and responding to the present historical context. According to Schudson (1998), monitorial citizens "scan (rather than read) the informational environment … so that they may be alerted on a variety of issues … and may be mobilized around those issues in a large variety of ways" (p. 310). Monitorial citizens are "defensive," rather than "proactive," surveying the political scene, looking "inactive, but [poised] for action if action is required" (p. 311). In the same vein, and adapted to the context of the Internet, Bimber's (1998) model of "accelerated pluralism" presents the environment within which the digital citizen functions, in which "the Internet contributes to the on-going fragmentation of the present system of interest-based group politics and a shift toward a more fluid, issue-based group politics with less institutional coherence" (p. 135).

The identity of the digital citizen is fluid and flexible, but also fragmented. Citizens are digitally enabled and digitally connected, but not part of a digital collective or cognizant of an identity that corresponds to a claim to digital citizenship. It is apparent that the digital citizen is no different from the off-line citizen; just technologically equipped. Confusion and redundancy, in terms of how politicians and the media view the digital public, discourage a collective digital consciousness. The digital citizen is hailed to enter the political sphere of interaction in ways that rely on one-way communication. While indeed digital media augment surveillance possibilities for the ordinary citizen, they do not necessarily provide channels through which substantive political action may be generated. Digital media do offer great promise regarding the role the citizen can play in the present political environment, yet this promise is restricted by the predisposition of the political system, which allots the citizen the role of the distant purveyor.

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## KEY TERMS

**Citizen:** A person owing loyalty to and gaining sense of identity from belonging to a certain place.

**Civic Engagement:** Activity related to citizens and the affairs of citizens forming a public.

**Cynicism:** A general distrust for the motivation and efficacy of others' actions.

**Digital:** Expressed in numerical form, to be used in the design and application of technology.

**Digital Citizen:** A person deriving identity and loyalty from functioning within a digital space.

**Political Efficacy:** The power to generate an effect of civic substance and consequence.

**Public Opinion:** Publicly expressed judgment concerning the community or the people.

# Digital Divides and Grassroots-Based E-Government in Developing Countries



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## INTRODUCTION

Once properly managed, e-governance can add tremendous dynamism in reforming public administration and can change the mode of interaction between the state and its citizens. However, concerns regarding digital divides and the challenges of e-governance in the developing states of Africa, Asia, and Latin America are growing. If the factors contributing to digital divides are not carefully identified and properly solved, there is a growing risk that in the coming years digital resources might become the preserve of the "haves," while ignoring the plight of the "have-nots" as they seek access to resources in developing countries. The current Secretary General of the United Nations, Kofi Annan (2000) provided the insight that new information and communications technologies are bringing people together, and bringing decision-makers unprecedented new tools for development. At the same time, however, Mr. Annan added, the gap between information "haves" and "have-nots" is widening, and there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy.

E-governance in this article could be referred to as the use of digital devices, usually by public authorities, when dealing with their public, private and non-profit stakeholders. E-governance comprises a practice, process, or activities through digital means and could equally be practiced by different stakeholders in managing public affairs. While in contrast "e-government" is defined by Shafritz and Russel (2003) as conducting any aspect of government business operations over the Internet—from providing information by government to paying bills to the government. This article examines and analyzes the current status of emerging electronic and Web-based governance (e-governance) in developing countries. In doing so, the article outlines the market model, participatory state model, flexible government model, and the deregulated government model presented by Professor Guy Peters for reforming governance. In light of the above, the article brings forward the emerging issues of governance, e-governance, and the possibility of shared governance. Emerging e-governance is reshaping the process of administrative reforms in developing countries—which requires fresh academic research and a scholarly contribution.

## THEORETICAL BACKGROUND AND PRACTICAL CONCERNS

### Theoretical Background

In terms of technological efficiency and effectiveness, it seems that e-governance can be applied in developing countries. However, in practice, models of e-governance remain a paradox between myth and reality in most countries struggling to overcome their present-day developmental challenges. The emerging trend of e-governance in global development and the dynamic interplay of power and practices between the local, national, and transnational governmental agencies are real concerns in development management led by information and communication technology (ICT).

Professor Guy Peters (2001) brought valuable theoretical insights in the areas of changing states, governance, and the public sector. His work brings new perspectives into administrative reforms in developing and transitional countries where he presents the contesting scenarios of the following four models of governance. His scholarly work provides an important insight and the scope with which to understand the growing concerns of governance and to analyze e-governance in developing countries. His theoretical arguments are summarized below:

1. **Market Models:** Claim that private-sector methods are almost inherently superior for managing activities, when compared to those of the traditional public sector.
2. **Participatory State Model:** Is completely the ideological antithesis of the market approach and emphasizes the promotion of political, democratic, and collective mechanisms by laying emphasis on public participation.

3. **Flexible Government Model:** Emphasizes the capability of the government to respond effectively to new challenges and survive in the face of change.
4. **Deregulated Government Model:** Is built on the assumption that if some constraints on bureaucratic action were to be eliminated, government could perform its functions more effectively. The work provides directions for future reforms and changes in governance.

Probably the context of e-governance in developing countries is more suitable to the above private-sector led market models for reforming the government. The participatory state model is completely the ideological antithesis of the market approach and emphasizes the promotion of political, democratic, and collective mechanisms by promoting public participation. Due to various concerns with resource scarcity, low rates of literacy, and other disadvantaged human development indicators, e-governance cannot be easily promoted in developing countries. However, e-governance may result in increased attention being paid to the third alternative, the flexible government model—which emphasizes the capability of the government in responding effectively to new challenges and in surviving in the face of change. As a matter of fact, this is what most developing countries are doing with emerging Internet-based operations. And finally, Peters' deregulated government model also suits well the basic principles of e-governance in assuming that if some constraints on bureaucratic action are eliminated, government could perform its functions more effectively. Probably the context of e-governance is opening up a new theoretical horizon for shared governance, which Professor Peters (2001) did not address. However, the practical challenges of establishing e-governance in developing countries are many. The following section may help understanding of the context.

## The Practical Concerns

Initiating grassroots-based e-governance is not easy. Comparable indicators of the "networked world" are even more skewed than those in the "economic world." One may ask the question: how? Singh (2000) presents the scenario: at the turn of the millennium the richest 20% of the world's people accounted for 93.3% of Internet users, while the poorest 20% accounted for 0.2% of Internet users. While the Internet is, in theory, the great leveler, in practice, various divides are becoming accentuated. For example, South Asia, with 23% of the world's people, has less than 1% of Internet users. Though growing, however, on average African countries will not account for more than this percentage—if not less. While only 10% of the people worldwide speak English, almost 80% of all the Web sites are in English. There is a strong correlation between the spread of telephone lines, televisions, fax machines, personal computers, and Internet usage. More importantly, buying capacity has always remained the central question: what percentage of the people living in the developing world can afford new technologies? The fact of the matter is that by the end of the twentieth century more than 80% of the people in the world had never heard a dial tone.

Traditionally, a major obstacle for the effective performance of public bureaucracies in most developing countries is the excessive concentration of decision-making and authority within the central government. Decentralization within the state involves a transfer of authority to perform some service to the public from an individual or an agency in central government to some other individual or agency closer to the public to be served. However, in practice, the challenges to good governance through decentralization are numerous. In most developing countries, there has been a tendency of independent governments to prefer delegating power within the public services rather than through locally elected authorities. Also the capacity of local and regional authorities has remained generally weak. There has been much rhetoric about participation and local autonomy, but central governments have jealously guarded their power (see, e.g., Turner & Hulme, 1997). Similar findings have also been experienced by other researchers (e.g., Khan & Zafarullah, 1991; Seppälä, 2000) in their work on central and local governance. In general, governance has thus remained far from being referred to as "good." Therefore, one could easily judge how enthusiastic the central governments in developing countries would be to initiate effective e-governance, which might start to open up doors to real administrative decentralization.

Naturally, having considered the above scenarios, the establishment of e-governance in the developing world will sound "ambitious"—and a major, daunting task. However, in the era of electronic activities, e-governance is being initiated and certainly will move forward—even in the developing countries. In the meantime, if ICT possibilities are not given to the world's poor, the technological divides will grow even further and provoke legitimate concerns about "inclusiveness" and "exclusiveness" in systems of governance. In addition, the emerging e-governance will create opportunities for the "few" and ignore the plight of the "many." But will it lead scholars to re-think alternative definitions of good governance? It will, especially if the grassroots-based challenges of electronic governance are not taken care of in advance.

## CHALLENGES OF GRASSROOTS-BASED E-GOVERNANCE IN DEVELOPING COUNTRIES: OBSERVATION AND ANALYSIS OF SELECTED KEY ISSUES

Compared with the possibilities, the challenges in promoting e-governance in developing countries are many; they are summarized in this section. The relatively low rate of literacy in developing countries is one of the major challenges that e-governance is facing. Even literacy alone does not guarantee computer literacy, not to speak of fluency in English, which are often needed in order to gain access and use the basics of e-governance. Purchasing power is always connected to the socio-economic status of the individuals—that is, it must be asked if people with an average income can even buy a computer and bear the operational costs related to the computer and Internet services? Even though someone has got all the required skills, the necessary economic basis, and a computer, it still depends on the availability of the basic infrastructural support to actually gain access to the computer and the Internet. This means, for example, electricity, availability of Internet services, even in some cases telephones, and so forth. Purchasing power of the poor should not be difficult to guess. It can also be hard for a growing number of the poor in the present world to justify the use of a computer in their everyday lives as even the basic services (i.e., housing, healthcare, education, etc.) are not secured.

Very few scholars actually disagree with the assumption that the success of e-commerce cannot be equally expected in e-governance. E-led business or governance may produce good results at the micro-level, which may become inappropriate at the macro-level—since e-led operations often in the first place exclude the poor and disadvantaged. At the same time, the failure of the macro-level e-approach may have a direct effect on a large number of populations regionally or nationally. The legitimacy of government-provided information could very much depend on the good will of the party-in-power. As stated earlier in this article, 80% of Web resources are in English—while only a small proportion of people generally with a sound economic background in the developing world are proficient in English. It is important from citizens' perspective to ask: Who provides and maintains the Internet information? Is the information useful? What can citizens do with the information provided?

### Internet and Governance: An Overview

Today Internet-based operations constitute a huge information flow—some of it is useful, some is not, and much of it is simply advertisement. In order to shift governance into the computer-based world of operations, one has to be practical, since governance encompasses all citizens—from every walk of life, no matter who he or she is. The Web resources on e-governance in many countries are full of e-advertisements—like "meet our ministers," "the cabinet," "president's bio," and so forth. Access to classified information vs. non-classified information also creates a dilemma in the state-citizen relation. Classified information for some powerful people and nonclassified information for general citizens does not bring democracy into governance. The concept of "gate-keeping" in the flow of state information will result in e-colonialism. Technology can exclude people, but governance should not. As a matter of fact, the moral foundation of good governance is democracy and the inclusive nature of the state. The performance of governance should be measured not by the selection of technologies the state uses, but by the participation that the state promotes in its operations. This is indeed a matter for the dynamic interplay between ethics and economics.

## FUTURE TRENDS

E-governance can bring the central government closer to people by bypassing unnecessary bureaucratic interference by local authorities or oligarchic regimes. At the same time, local governance operations can be made more transparent by initiating e-governance. Today, people can share a lot of useful information with their governments around the world. Most importantly, citizens are enjoying direct access to useful information by bypassing bureaucrats and conventional and conservative bureaucratic systems. Inter-governmental relations are gradually becoming possible through online governance systems. E-governance is also creating awareness of the merits of the information society, computer literacy, and visual governance. It is also creating new jobs every day. Many citizens are enjoying job facilities by familiarizing themselves with some basics of electronic services. E-governance may make traditional bureaucracies more accountable—and citizens more responsible. A good example is computer-based tax administration. Electronic governance has got the potential for promoting electoral democracy—the recent success of effective election monitoring systems in developing countries is well known. Success stories of e-governance at the micro-level are numerous—and they range from the level of governmental relations to relations between public, private, and third sector organizations, as well as between private citizens. There is every reason to believe that the journey towards e-governance will continue in

the future, and developing countries will also gradually start reaping the benefits of this form of electronic governance. Therefore, strategic policies are needed in order to manage the transitional stages of present-day e-governance.

After considering the practical challenges, it is clear that before reaching any sustainable e-governance policies, most developing countries have to go through a transition and adopt a practice of e-governance at the micro-level before stepping into national or macro-level operations.

## SUITABILITY OF E-GOVERNANCE FOR TRANSNATIONAL AGENCIES, NGOs, AND COMMUNITY-BASED ORGANIZATIONS

One would agree that the concept of e-governance in the developing world did not come through indigenous means. Obviously the impetus really came through foreign aid agencies and local non-governmental organizations (NGOs) and community-based organizations connected to international governmental agencies, that is, the United Nations, the World Bank, OECD donor agencies and other transnational governmental agencies (see, e.g., Ferguson & Gupta, 2002). Certainly different private multinational companies are also involved in producing, manufacturing and supporting computer-based e-technologies in the developing world. It is believed that NGOs and community-based organizations have got a comparative advantage in development management (see, e.g., Anheier, 1990; Anheier & Seibel, 1990; Hulme, 1994; Hossain, 2001; Mälkiä & Hossain, 1998). Their comparative advantage is also applicable in developing e-governance. The restructuring policies of the World Bank and other influential donor institutions (e.g., in OECD countries) led to a planned reduction of the role of the state in developing countries and increased space for development NGOs (Tvedt, 1998).

The thorough and impressive analysis of Helmut Anheier (1990) on the comparative advantage of NGOs in developing countries can be referred to here. In his social, economic, political, and cultural arguments (see also Mälkiä & Hossain, 1998), one could easily understand the presented context of e-governance and the suitability of NGOs in promoting e-governance in developing countries.

The *social argument* comprises the idea that NGOs try to stimulate the participation of the poor and are able to reach those strata of disadvantaged Third World societies that are bypassed by public service delivery systems. This argument attaches greater social equity to private voluntary efforts than to the public sector. Because of shortages of public funds combined with cultural and social access problems, disadvantaged populations are difficult to reach by conventional service systems—a problem that is amplified by elite influences on governmental decision-making. Thus, NGOs are in a better position to reach the poor and the disadvantaged.

The *economic argument* claims that NGOs are able to carry out services more economically than governments. In addition, as they are not seeking to profit from their actions, they usually aim at self-reliance and self-sufficiency. Just as the social argument refers to equity, the economic argument addresses the greater efficiency of NGOs. Their efficiency could be a guarantee of their operational sustainability and credibility to the donors. Greater efficiency among NGOs is largely based on a major cost advantage, which is related to both lower labor costs and incomplete pricing, that is, not making provisions for depreciation, relying on voluntary local inputs, not including transaction costs, and so forth. Moreover, according to this type of argument, failures connected with NGO-led projects (as compared to failures with government-led ones) have much less impact on the economy as a whole, since nearly all NGO-led development projects are designed and implemented at the micro-level. Governments, on the other hand, are often working at the macro-level.

The *political argument* suggests that NGOs are relatively immune to changing political tides, while government policies and agencies are subject to unexpected change. An extension of the political argument refers to the "hidden agenda" and ultimately the political motivation of official development assistance if we consider aid as a political tool in global politics. By using NGOs as local and international operators, the problems with hidden agendas can be better dealt with. Thus, in general, NGOs are believed to be more "honest" and less guided by political considerations.

Finally, the *cultural argument* stipulates that NGOs, embedded in the local culture, are more sensitive to local needs and their articulation. Rather than replacing indigenous social structures with large-scale organizations, NGOs try to nurture local organizations within their own cultural context.

Stakeholders in recent years have experienced a real developmental concern with NGOs and the developing states in Africa, Asia, and Latin America. There are obvious reasons to believe that governments cannot implement sustainable e-governance alone. The market model, participatory state model, flexible government model, and the deregulated government model of governance developed by Professor Guy Peters (2001), which was presented and discussed at the beginning of this article, are also not equally suitable for the individual

governments alone to use in designing their e-governance strategies. Whereas the same models could be beneficial for the government agencies in designing their e-governance strategies while they work in partnership with NGOs and the private sector at local, national and international level. Therefore, involving NGOs and other community-based organizations in e-initiatives would always provide a strategic advantage.

## E-Governance Through Shared Governance?

In recent decades, governance has evolved to the extent that it is no longer in the domain of the public sector alone. Emerging concepts of "transnational governance" and "shared governance" pluralize traditional theories of public administration and give increased roles to a diverse group of stakeholders involved in governance in the developing countries (Ferguson & Gupta, 2002; Hossain, 2002; Nelson, 2000). This very concept of shared governance gives increasing roles to the private and third sector (e.g., civil society, NGOs) in development management (see, e.g., Tvedt, 1998). In this scenario of global governance, the dynamic interplay of power and politics between local, national, and transnational agencies provides contesting dimensions for local governance and administrative decentralization. At the same time this interplay also provides possibilities to these organizations to solve local problems with shared responsibilities. Though transnational agencies often challenge the traditional, legitimate, and naturalized authority of the state over the local and suggest new forms of "grassroots" governance, they can contribute to promoting e-governance together with local NGOs and community-based organizations. Indeed, the dimensions of e-governance mentioned above are reshaping the process of administrative reform in developing countries. Research attempting to empirically cover the context of e-governance and the dynamic interplay of power and politics between local, national, and transnational agencies can provide interesting and useful perspectives.

## CONCLUSION

The developmental challenges of the present world and the division between the rich and the poor also bring about an ethical perspective on the subject. An in-depth and empirical exploration is required to explain the current status, challenges, and the possibilities of people-centered grassroots-based e-governance in developing countries. Further exploratory and thorough research should be carried out on the contemporary factors of digital divides and the practical challenges of e-governance. As Kofi Annan (2000) emphasizes, information technology is not a magic formula that is going to solve all our problems. But it is a powerful force that can and must be harnessed to our global mission of peace and development. This is a matter of both ethics and economics.

Whatever the obstacles to e-governance might be, the local, national, and transnational stakeholders in development management must constantly promote and ensure citizen participation in e-governance by making use of various meaningful channels. In order to make e-governance sustainable, people living at the grassroots level in the developing world should be given the right to share their concerns with the local, national, and international governmental agencies. An individual poor person is an isolated island by himself and herself. Information technology can end that isolation overnight (Yunus, 2005). The poor of the world certainly should be an integral part of the emerging global information society.

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## KEY TERMS

**Developing Countries:** Countries with underdeveloped and transitional economies.

**Digital Divides:** Refers to the division between electronic "information have societies or communities" and "information have-not societies or communities" among and within countries of the present world.

**E-Governance:** E-governance could be defined as the practice of using digital devices; usually the public authorities use them when dealing with their public, private and non-profit stakeholders. This comprises a practice, process, or activities through digital means and could equally be practiced by different stakeholders in managing public affairs.

**E-Government:** E-government refers to electronic and Web-based governance – e.g., conducting any aspect of government business operations over the Internet – from providing information by government to paying bills to the government (Shafritz & Russel, 2003).

**Governance:** Governance refers to modes of managing public institutions in terms of "effectiveness" and "legitimacy"; the essence of both may be judged on the basis of participation, the rule of law, transparency, and accountability (Ibrahim, 1997).

**Grassroots:** Local, community-based and citizen-oriented development intervention.

**NGOs:** Non-governmental organizations refers to non-profit oriented and society-based community development organizations.

# Digital Governance and Democratization in the Arab World

D

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## INTRODUCTION

Making the choice to be an Internet society is not a process governed simply by a state's attitudes towards computers and the data that flows between them. Rather, being an Internet society means fostering the wide embrace of perspectives modeled on the technology itself. The basic components of designing an Internet society include a commitment to the free flow of information across and among hierarchies; a belief that it is best not to privilege any single information node; a realization that censorship is difficult if not futile; and a commitment to the idea that communities, companies and individuals have the right to represent themselves within electronic landscapes. All of these information attitudes have spill over effects in the real world. While constructing an Internet society is also about building information infrastructure and teaching people to use new tools, it is the clear spill over effects linked with the technology's design principles that have most developing countries proceeding with caution. For many countries around the world, especially (semi) authoritarian ones, no matter how strong the economic incentives for being an Internet society are, politically and socially, accepting such processes of change without selective state intervention is uncommon. Nowhere are these interventions more apparent than in the puzzling mosaic of Internet led development in the Arab World.

This article entertains a series of questions regarding emerging Internet societies in the Arab World:

1. To what degree is the Internet spreading in the Arab World and what factors are most commonly driving (or inhibiting) these processes of technological change?
2. In what way is the Internet contributing to processes of political change in the region? And how is the authoritarian state intervening to regulate Internet use in an attempt to control the spill over effects of such use?
3. What might be the longer term impacts of emergent Internet cultures in the region?

## BACKGROUND: INTERNET DIFFUSION IN THE ARAB WORLD

While the Internet has been evolving for the past five decades, it's presence as a part of everyday life in the Arab World is relatively new.1 The first connections to the Internet in the region date back to the early 1990s. For example, Tunisia was the first Arab country to link to the Internet (1991). Kuwait established Internet services in 1992 as a part of its reconstruction after the Iraqi invasion. In 1993, Egypt, Turkey, and the UAE established links to the Internet. Jordan linked to the Internet in 1994; while Syria and Saudi Arabia were the slowest states in the region to allow public access to the Internet—with regular access not available until the late 1990s. In Syria for example, even as late as 1997, there were only two places with Internet access—the American Cultural Center and the Syrian Engineers' Association, both located in Damascus. When Bashar Al-Assad, former president of the Syrian Engineers' Association and son of the late Hafiz al-Assad became president of Syria June 10, 2000, Internet access began to be more readily available. Before then, many Syrians were obtaining access via long distance phone calls to Internet service providers (ISP) in Lebanon and Jordan. These same practices of long distance remote access to the Internet (this time via Bahrain) was also common in Saudi Arabia, before the state made access to the Internet available through locally licensed ISPs. Thus when we study the development and meaning of the

*Table 1. Internet users by region 2004 (http://www.nua.com/surveys/how_many_online/index.html)*

| | |
|---|---|
| World Total | 605.60 Million |
| Africa (5 million in South Africa) | 6.31 Million |
| Asia/Pacific | 187.24 Million |
| Europe | 190.91 Million |
| Middle East (2.5 million in Israel) | 5.12 Million |
| Canada and USA | 182.67 Million |
| Latin America | 33.35 Million |

*Table 2. Internet users in the MENA region 2001 (Adapted from NUA How Many On-Line, http://www.nua.com/surveys/how_many_online/index.html)*

| Country | Number of Users | Percent of Population |
|---|---|---|
| Algeria | 180,000 | 0.57% |
| Bahrain | 140,200 | 21.36% |
| Egypt | 600,000 | 0.85% |
| Iran | 420,000 | 0.63% |
| Iraq | 12,500 | 0.05% |
| Jordan | 212,000 | 3.99% |
| Kuwait | 205,000 | 8.91% |
| Lebanon | 300,000 | 11.22% |
| Libya | 20,000 | 0.24% |
| Morocco | 400,000 | 1.28% |
| Oman | 120,000 | 4.42% |
| Palestine | 103,000 | 3.03% |
| Qatar | 60,000 | 7.59% |
| Saudi Arabia | 570,000 | 2.5% |
| Sudan | 70,000 | .21% |
| Syria | 60,000 | 0.35% |
| Tunisia | 400,000 | 4.08% |
| UAE | 900,000 | 36.79% |
| Yemen | 17,000 | 0.09% |
| **Total** | **4,902,200** | **2.45%** |

*Table 3. (Madar Research, 2002)*

| Country | Number of Internet Cafes |
|---|---|
| Bahrain | 90 |
| Egypt | 400 |
| Iraq | 50 |
| Jordan | 500 |
| Kuwait | 300 |
| Lebanon | 200 |
| Libya | 700 |
| Oman | 80 |
| Palestine | 60 |
| Qatar | 80 |
| Saudi Arabia | 200 |
| Sudan | 150 |
| Syria | 600 |
| Tunisia | 300 |
| UAE | 191 |
| Yemen | 120 |
| Morocco | 2,150 |
| Algeria | 3,000 |

Internet in the Arab World, we are really looking at a short, but rapidly changing history.

The general statistics are not encouraging with regards to information technology (IT) diffusion in the Arab World. The Arab World constitutes 4% of the world's population, yet it contains less than 0.1% of the world's Internet users. Moreover, world production in of Information and Communication Technology (ICT) equals 1.2 trillion dollars, while the Arab World's share of this economy is tiny. According to its population size, the Arab World's share of this global technology production should be 48 billion dollars; while in real terms, production of ICT in the region is only a fraction of this—Egypt: $418 million; Saudi: $642 million; Lebanon: $400 million (2000 estimates). One factor which weakens production in ICT is the underutilization of female knowledge capital in the region. For example, women equal 63% of university students in the Arab World, and yet women constitute only 30% or less of the labor force (Shalhoub, 2003, p. 3).

Internet use disaggregated by country reveals great regional disparities.

Connectivity in the region ranges from high Internet penetration in countries like the United Arab Emirates (nearly 40% of the population is online) to places like Sudan, where only 0.2% of the population are Internet users. One problem with connectivity measures is that a large portion of society in the region goes on line at an Internet café or community access point (such as Publinet centers in Tunisia and Knowledge Stations in Jordan)2. Current measures grossly underestimate the popularity of the Internet in everyday life by failing to capture users not tied to a particular Internet protocol (IP) address or ISP. Perhaps it is not by accident, that there is a strong correlation between the number of Internet cafes within a country and low connectivity figures by conventional measures.

Thus, in Algeria there is an estimated 0.57% Internet penetration, judged by the number of Internet accounts, but a high availability of Internet cafes, an estimated 9.52 cafes per 100,000 inhabitants. Similarly, in Libya, where per capita Internet penetration is estimated to be 0.24%, there are an estimated 13.21 Internet cafes per 100,000 inhabitants. Given the difficulties in determining what percentage of the population has access to the Internet via Internet cafes, it is hard to judge the mass appeal of the Internet. If in places like Algeria and Morocco, there is enough public demand for the Internet to support two or three thousand Internet cafes, then the Internet must be more important than indicated by conventional estimates. The large number of Internet cafes in the MENA region suggests that the Internet may be more of a mass technology than currently documented (Wheeler, 2004a).

## Factors Shaping Internet Diffusion in the Arab World

There are at least nine factors which shape the diffusion and use of the Internet in the Arab World including:

1. Infrastructure
2. State

3. Education
4. Economy
5. Location
6. Gender
7. Age
8. Size
9. Public opinion and culture

Infrastructure determines who has easy access to Internet technologies, as well as the cost of access. For example, it is very common to find a mass base of Internet users in the capital cities of the Arab World, but less common to find active Internet users in rural locales or small villages where infrastructure is weak or non-existent. Recognizing the role that infrastructure plays in expanding Internet access, several countries in the region have invested in building community access points throughout their territory, even reaching places where market demand is low, and infrastructure had to be built from scratch. This is especially the case in Tunisia, Egypt, and Jordan (Hashem, 1999, 2000).

State support for Information Technology use is a vital factor in shaping regional Internet cultures. As evidenced in the case of Egypt, Morocco, Jordan, and Dubai, the willing support of the leadership structure for building and expanding an Internet society makes a huge difference in the cost and ease of access, the presence of Internet training and access in schools, the shape and scope of e-governance programs, and public attitudes towards the technologies.

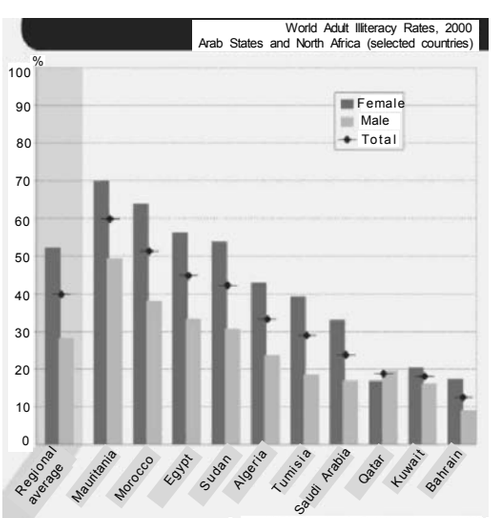
Education levels and the quality of education help to shape regional Internet cultures. In places like Morocco and Egypt, where illiteracy is high, Internet penetration is low. In countries where literacy, fluency in English, and early training in the use of computers and the Internet is high, public demand for and familiarity with the Internet is also high, as is the case in Bahrain.

Those countries that are actively building a knowledge economy and attempting to leverage information technology sectors to stimulate local economic growth tend to have higher Internet awareness and use, and more e-governance capability. We see regional knowledge economies emerging in Lebanon (a recent study found 12.5% growth in the IT sector in Lebanon) (USAID, 2004), Dubai (as evidenced by the Dubai Internet City www.dubaiinternetcity.com), Bahrain (especially in the banking industry), and to some extent Jordan (Nearly 6% of the Jordanian GDP comes from IT related exports) (Ministry of Foreign Affairs, 2004, p. 1). Another economic factor which shapes regional Internet cultures is oil wealth. Most of the countries in the Gulf have higher Internet penetration rates than the rest of the Arab World.

Location matters, both in terms of capital and information resources tending to concentrate in the Gulf region, but also domestically, in terms of proximity to the capital city. The closer one is to a capital city, the higher the likelihood one will find reasonable and regular access to the Internet. For example, in Lebanon, "half the population of Greater Beirut between the ages of 18 and 48 are internet users" whereas Internet penetration rates for the country as a whole are just over 11%. Moreover, "90% of ICT related sales are concentrated in the capital" (Office of the Minister of State for Administrative Reform, 2003, p. 18). The geographic nature of the digital divide can also be felt in terms of number of land lines per location, with only 45,000 phone lines in the Bekaa valley, and 279,000 in Greater Beirut (Office of the Minister of State for Administrative Reform, 2003, p. 18).

Gender also shapes regional Internet cultures. Our most recent data (2001) suggests that 6% or less of Internet users in the Arab World are female (Hafkin & Taggert, 2002, p. 5). Explanations for low female participation in Internet cultures include low literacy rate. In Yemen, for example, 90% of women cannot read or write according to the National Committee for Literacy. According to the UNESCO chart above, 65% of women in Morocco are illiterate, whereas in Egypt, female illiteracy hovers just over 55%. Low representation of women in the work force is also a contributing factor to women's slow adoption of Internet technology. Regionally, women constitute less than 30% of the work force. Even in Lebanon, where female participation in the labor force is the region's highest, women still only constitute 28% of the work force (Prusher, 2000, p. 6). A recent study of women's Internet use in the Arab World illustrates that many Arab women are not Internet users until they are

*Figure 1.*



trained or required to use the technology for work (Wheeler, 2004b). Cultural and religious issues have also been suggested as factors in limiting women's Internet access and use.

Age is also a contributing factor to regional Internet cultures. It is common to find a lack of Internet use regionally among citizens who are 40 and over. A study by DITnet found that a less than 5% of Internet users in the Arab World are aged over 46 (DITnet, 1999, p. 1). Since nearly 60% of the population in the Arab World is youths, under the age of 30, age alone cannot explain slow Internet growth rates (Gerges, 2004, p. 2).

The size of a country, in terms of land mass and size of population also shapes regional Internet cultures. Smaller countries, like Bahrain, Kuwait, and the United Arab Emirates tend to have much more comprehensive information infrastructures and thus higher Internet penetration rates. Countries like Oman, Morocco, and Jordan, with larger land masses, and Egypt, with its huge population (76,117,421 million, July 2004 est.) tend to have less depth and breadth of Internet access points, and fewer people who can afford access.

Public culture and opinion also shapes Internet attitudes and use. In more open information environments, citizens are more accustomed to seeking out alternative sources of information and are attracted to the Internet. In cases like Syria and Tunisia where the state maintains tight control of information environments and regularly arrests and harasses citizens for "illicit" Internet activities, there is a stronger culture of self censorship and Internet abstinence. The opposite might also be true; that is that in strict authoritarian settings, some citizens might be more drawn to the Internet as a source of uncensored information. But the costs for surfing can be high if the government interprets access to banned sites (e.g., as a threat to national security). As explored more completely below, there have been many people in the region arrested for illicit Internet use.

## POLITICAL EFFECTS OF THE INTERNET

The political effects of the Internet in the Arab World include use of e-governance projects to stimulate good governance and political reform, enhanced processes of civic engagement stimulated by the discussion of politics and social issues in on-line forums, and increased powers of the state for surveillance. States in the region regularly filter the Internet (Zittrain & Edelman, 2002), and attempt to maintain tight control over on line environments, often arresting cyber dissidents. Such arrests illustrate that at this stage, the Internet in the Arab World more clearly enhances state power rather than individual human rights. While headlines claim, "Technology fuels democracy in the Middle East" realities on the ground suggest the need for caution (Mitchell, 2005, p. 1). The same technology that empowers individual freedoms of self expression also extends the powers of the state.

One reason for caution regarding the power of the Internet to promote good governance in the region is that many countries in the Arab World are under prepared for harnessing the power of e.governance adoption. While the Arab World scored above the global mean for e-governance readiness in a recent survey, there remain only 4 countries in the region that scored in the "High Capacity for E-Governance" category globally (UNPAN, 2004, p. 2). These include United Arab Emirates, Kuwait, Bahrain and Lebanon. The highest ranking country in the Arab World, the United Arab Emirates, placed 21$^{st}$ globally for e-government capacity. The lowest ranking country of those surveyed in the region was Oman, with a global ranking of 56$^{th}$ place. Countries like Yemen, Syria, Morocco, Sudan, Libya and Algeria were not included in this study. Had they been, the Arab World more likely than not would have been rated above the global mean for e-governance capacity. This survey measured the degree to which countries "were able to facilitate information access for enhanced citizen participation through e-governance." Measurements included indicators of a country's official on-line presence, telecom infrastructure and human development level.

E-governance ratings also indicate the degree to which "a country's leadership recognizes the fact that information has become a social and economic asset" (UNPAN, 2004, p. 1). This level of understanding is clearly evidenced in the state of Jordan. His Majesty King Abdullah II observed in 2002 that "In a networked world, investors have a low switching cost to move from one country to another. Governments that are not business and citizen-centric will not be able to compete. This necessitates a fundamental shift in the way government operates and hence the importance of e-government initiatives" (MOICT, 2002, p. 1).

Examples of the relative state of e-governance capabilities in the Arab World:

1. Saudi Arabia is in the initial stages of developing e-governance, and as of yet, does not have a "true national site or portal," however, four branches of government, the Ministries of Health, Labor, Education, and Foreign Affairs do have a Web presence (www.moh.gov.sa; www.mol.gov.sa; www.moe.gov.sa; and www.mofa.gov.sa) (United Nations, 2004, p. 38).
2. Egypt in 2004 launched an e.government central services portal (www.egypt.gov.eg/english/

*Table 4. (Adapted from UNPAN Global E-Governance Index, 2004)*

| Country | PCs/100 | Int Hosts/ 10000 | Tele lines/100 | Mobile/ 100 | TVs/ 1000 | Human Dev. Index | Urban as % of pop. | E. Gov Index |
|---|---|---|---|---|---|---|---|---|
| UAE | 12.51 | 176.00 | 41.79 | 58.51 | 294.00 | 0.809 | 85.5 | 2.17 |
| Kuwait | 12.13 | 17.55 | 24.40 | 24.86 | 491.00 | 0.818 | 97.4 | 2.12 |
| Bahrain | 13.98 | 0.77 | 24.97 | 30.05 | 419.00 | 0.824 | 91.8 | 2.04 |
| Lebanon | 4.64 | 23.00 | 19.96 | 19.38 | 352.00 | 0.758 | 89.3 | 2.00 |
| Saudi Arabia | 5.74 | 1.73 | 13.72 | 6.37 | 26.00 | 0.754 | 85.1 | 1.86 |
| Turkey | 3.81 | 10.64 | 28.00 | 24.56 | 286.00 | 0.735 | 74.1 | 1.83 |
| Qatar | 13.58 | 37.68 | 26.77 | 19.96 | 808.00 | 0.801 | 92.3 | 1.81 |
| Jordan | 1.39 | 1.36 | 9.29 | 5.38 | 52.00 | 0.714 | 73.6 | 1.75 |
| Egypt | 1.20 | 0.35 | 8.64 | 2.14 | 127.00 | 0.635 | 45.5 | 1.73 |
| Oman | 2.64 | 11.46 | 8.88 | 6.48 | 595.00 | 0.747 | 82.2 | 1.64 |

default.asp). The site offers basic services such as requesting a birth certificate, paying a phone bill and renewing vehicle licenses online (United Nations, 2004, p. 39).

3. In Oman, at the Ministry of Awqaf and Religious Affairs (www.mara.gov.om) one can register for the Hajj online.
4. Jordan recently began using the Internet to distribute the Tawjihi test scores. The Tawjihi exam is a test all matriculating high school students must take. A passing grade on this exam signifies that a student has passed high school and can enter the University. Passing the Tawjihi is also a requirement for joining the army, and other government service professions. In 2004, Jordan signed an enterprise licensing agreement with Microsoft to modernize government e-services. The government of Jordan continues to develop its list of e-government services which it will offer its population in the near future.
5. Dubai has the most developed e-government program in the region. Online in the UAE, one can log on to the Web to access customs clearance services, register for social security, search for a job, obtain a driver's license or passport, register a car, obtain a building permit, check resources at the public library, obtain birth certificates, enroll in higher education, and register for health services.

In spite of these signs of a transition towards more efficient government in the Arab World, in most cases, a complex bureaucracy of sometimes non-transparent transactions are required for many government services. Applying for government assistance, a residency permit, a business license, or registering a child for school can all require multiple visits to multiple ministries and government offices. Moreover, a rich history of privilege and influence known as "*wasta*" or using appeals to personal connections to get something better or faster than others, is also ripe in the region (Cunningham & Sarayrah, 1993). Often, it is those in most need of government services who cannot get them, because they live outside of the capital city, can't afford transportation costs, or don't understand their rights. Regional e-government projects are designed to bring more comprehensive services to more people, better and faster. Whether or not they will succeed remains to be seen.

While the governments in the region are attempting to harness the powers of the Web to create administrative reform, to enhance the investment climate, and to improve the transparency and responsiveness of government, citizens are likewise harnessing the power of the Web to carve out more participatory political climates and freer flows of information among citizens and global civil society (Eickleman & Anderson, 2003; Alterman, 1998). For example, a recent study of the impact of the Internet in Saudi Arabia observes, "Saudis are poised on the edge of a significant new social landscape. Called the Internet, this new frontier includes not only the creation of new forms of private communication, like electronic mail and chat, but also online public discussion areas, which for the first time enable communication between males and females in this gender-segregated society" (Saggaf, 2004, p. 1). Recent studies of the Internet in Kuwait support Saggaf's findings, suggesting that in the conservative Gulf, it is the politics of gender which are most easily transgressed and subverted online (Wheeler, 2001, 2003).

In Jordan and Egypt, for example, where relations between genders are more open, but spaces for talking about politics are more constrained, the Internet's transformative powers are more easily grasped in terms of its ability to enable the sharing of political ideas and opinions. A recent study of Internet café users often yielded evidence with which to support this view. (Wheeler,

*Table 5. Arab state attempts to discourage cyber-dissidence (Adapted from Reporters without Borders, 2004)*

| Country | Arrest | Charge |
|---|---|---|
| Tunisia | Zohair al-Yahyaoui, Journalist | Arrested June 4, 2004 and sentenced to 28 months in prison for "disseminating false news" on the Internet through his Web site TUNISIANE |
| Bahrain | Galal Olwi | Arrested in March 1997 and detained for 18 months. The charge was sending information via the Internet to the Bahraini opposition, "The Bahrain Liberal Movement." |
| Algeria | Ahmed Fattani, Journalist | Arrested on October 13, 2003 for "posting articles online while the paper he edited, Expression, was officially suspended." |
| Egypt | Ashraf Ibrahim and four other members of a "revolutionary socialist movement" which he runs. | Arrested on April 19, 2003, released on March 11, 2004. The group was using the Internet to publicize human rights violations, especially against the Copts. While acquitted, the charges against them were "trying to undermine the state by sending false news to foreign organizations" |
| Syria | Abdel Rahman Shagouri | Arrested on the of February 23, 2003 for emailing a newsletter Lavant News from the banned Web site www.thisissyria.net. He is still being held on charges that he "endangered Syria's reputation and security". |

2004a). For example, one 27-year-old female from Cairo observed,

*I love the Internet. It has made a huge difference in my life. It is a world of its own, and it has its own particular charms including abundant information, the chance to know people from all over the world, having all kinds of discussions from politics to social issues to religious debates ... It is interesting to chat and to make friends. I like talking to foreigners. I am not that keen on the closed Arab mentality. I like people who are themselves in chat ... no masks. In person they have to put on masks.* (Interview, Cairo Internet Café, May, 2004)

Similarly, a 21-year-old female from Cairo observes,

*The net has surely changed my life. I like to read and to get info about different topics and ... I like to also know in detail about news from events in the Arab World, and we discuss them in chat forums. The net is a great invention to get to know new people and exchange opinions.* (Interview, Cairo Internet Café, May, 2004)

This ability to share and develop opinions, to extend social networks, and to grow in one's political consciousness and commitment on world and Arab affairs represents one of the most powerful political effects of the Web. In the Arab World, the Internet is creating better informed citizens with more social capital and expectations for more responsive government.

We must not forget, however, that the Internet is not free from state surveillance. Especially in authoritarian countries, the loss of tight state controls on information environments has placed the state on the defensive. Some of the tactics used by the state to minimize the revolutionary effects of the Internet in the Arab World include using technologies like router-based IP blocking and, more recently, DNS redirection, to attempt to block the Web content they dislike, while still obtaining what they consider the benefits of the Internet (Reporters without

Borders, 2004, p. 10). Granting a monopoly over Internet service provision to one state run company in order to best exercise control over Internet use is another strategy used by Arab states to control and survey Internet data traffic (Tunisia, Oman, UAE, Bahrain Saudi). In this case, control is maintained by creating one pipeline for data transfer … easily monitored; and by keeping prices high so that most people cannot afford access. In addition, traditional methods of encouraging self censorship are also used to reduce the political power of the Internet. These old tactics include efforts by the *mukhabarat* (intelligence officers) to forge charges and prosecute any person who may transgress the unidentified line between that which is permitted and that which is prohibited. Typical charges: defamation, harming the state's reputation, violating public morality. Evidence of these more draconian methods include the recent arrest 27-year-old Bahraini Ali Abdul-Imam, the Webmaster of www.bahrainonline.org, a site that is openly critical of the Ruling al-Thani family and its government. The charges against Abdul-Imam were "stirring hatred against the government and spreading false news that could jeopardize state security. He could face a sentence of up to 20 years in prison (Reuters, 2005, p. 1).

## CONCLUSION: LONGER TERM IMPACTS OF THE INTERNET

The question remains, "where will Internet freedoms and experimentation lead, if at the same time, the powers of the state to police citizen's lives are enhanced by the same technology?" It is clear that as access to the Internet increases in the region, a greater mass of citizens, from a wider set of social, political and economic backgrounds, will be able to experiment with the technology. Those who experiment by sharing opinions and discussing politics, widening their social networks, but refrain from overt challenges and criticisms of the state, will contribute to organic forms of civic engagement as we see emerging in Internet cafes, community access centers, and private homes throughout the region. These forms of experimentation are disorganized and wide spread, and yet touch peoples' lives and political consciousness in fundamental ways. At the same time, the state, which is increasingly aware of the challenges the Internet poses to its control on public information, will continue to crack down on cyber activists who openly challenge the state. As surveillance techniques evolve, and Internet access and use grows, crack downs might also increase, as the state attempts to publicly impose strict boundaries on acceptable vs. unacceptable forms of cyber experimentation. These imprisonments are widely reported in the local media, and discussed via word of mouth. They serve to remind citizens that the government is watching what they do online, reminding them to self censor any questionable behavior … from surfing pornography, to logging on to banned sites, or distributing news without a license. At the same time, the forces of globalization are powerfully at work on Arab states. It is not possible for the knowledge economy to take root, grow and spread opportunity without more open information environments emerging. So, the economic incentive to foster a culture of discursive openness is strong in Arab societies. One cannot but help to think that the evident steps towards a more democratic politics in the region, as evidenced by recent elections in Iraq and Palestine, democratic reforms in Jordan, Bahrain, Qatar, and Egypt, and huge public demonstrations both for and against a Syrian presence in Lebanon, are not somehow enabled by and enabling new communications environments.

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## KEY TERMS

**Arab World:** The 22 members of the Arab League including Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen.

**Authoritarianism:** A political system where the administration of government is centralized. The ruler's personality may play an important role in maintaining the system and advancing the notion and practice of extreme authority as a political virtue. It is characterized by the curtailment of individual freedoms; excessive reliance on

actual and the threat of violence and punishment; virtual unaccountability of government officials; and the aversion of the decision-making process to consultation, persuasion, and the necessity of forging a policy consensus (Hart, 2005).

**Civic Engagement:** "Individual and collective actions designed to identify and address issues of public concern. Civic engagement can take many forms, from individual volunteerism to organizational involvement to electoral participation. It can include efforts to directly address an issue, work with others in a community to solve a problem or interact with the institutions of representative democracy. Civic engagement encompasses a range of activities such as working in a soup kitchen, serving on a neighborhood association, writing a letter to an elected official or voting" (Pew Charitable Trust, 2004).

**E-Government:** The delivery of government service through electronic means.

**Good Governance:** Government that is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive, and follows the rule of law.

**MENA:** Middle East and North Africa.

**Mukhabarat:** (Arabic) Secret police.

**Infrastructure:** The basic facilities and services for the functioning of a community or society, such as transportation and communications systems, water and power systems, and public institutions.

**Wasta:** (Arabic) Intercession or mediation; applying influence. Historically, the head of the family in the Islamic World performed wasta services by obtaining for the supplicant what is assumed to be otherwise unattainable. In the contemporary world, wasta is a common feature of attempts to derive goods and services from the state.

## ENDNOTES

1 For a more complete overview of the history of the Internet see "The Internet in Global and Local Imaginations" in Deborah L. Wheeler, (2006) The Internet in the Middle East: Global Expectations and Local Imaginations in Kuwait (pp. 1-30). Albany: State University of New York Press.

2 For Tunisia see: http://www.tunisiaonline.com/internet/publinet.html. For Jordan see http://www.ks.gov.jo/ and http://www.tve.org/ho/doc.cfm?aid=1379&lang=English

# Digital Government and Democratic Legitimacy

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## INTRODUCTION AND CONTEXT

The current flush of worldwide interest in digital government coincides with considerable anxiety, even discontent, with the performance of predigital democratic governments, including democratic governments in what seem to be highly functional societies. Primary causes for this malaise involve an interlocking set of complex phenomena. These include globalization, the marketization or privatization of ever-larger aspects of our social and economic life, challenges to the vitality of national political identities that are supportive of democracy, a pervasive sense that government is increasingly driven by special interests rather than a genuinely public interest, and the alienation of the ordinary citizen from governments that seem increasingly remote and indifferent (Castells, 1997). Although few still tout the Internet and universal interconnection as promising by themselves to cure all political ills, the fact is that hopes for digital government run high across the developed world. This enthusiasm seems linked to a yearning for improvements not just in government efficiency, but also in democratic legitimacy. It is the potential linkage between digital government and democratic legitimacy that this article will explore. My thesis is twofold: first, that digital government has enormous potential for enhancing democratic legitimacy, but second, it can realize that potential only if implemented with democratic principles in mind and if designed to fulfill multiple models of democratic legitimacy.[1]

## BACKGROUND CONCEPTS AND DEBATES

Discussions of this topic necessarily start with two matters of definition. The easier of these to address is the distinction that must be drawn between the phenomenon of digital government and the movement for "digital," "cyber-," or "electronic" democracy. "Digital government" is most widely used to refer to the use of digital information and communications technologies (ICTs) for the delivery of government services, as well for functions of government management and procurement. "Electronic democracy" refers to the design and deployment of digital ICTs to enhance democratic political practice. Although these goals and functions overlap, in ways about to be discussed, the distinction between them is significant. On the digital government side, for example, there exist significant Web applications that enhance government efficiency, but have virtually nothing to do with policy making or public accountability. By contrast, electronic democracy initiatives may well include online campaigns to facilitate grassroots community organizing among the citizenry or interaction among organizations of civil society—activities that do not involve government actors at all.

The second, and much harder issue, is, "What does 'democratic legitimacy' mean?" At the most general level, political "legitimacy" presumably refers to the moral entitlement of any governmental entity to wield political power. Allan Buchanan (2002) has argued that, for a democracy, political legitimacy must rest upon processes that help assure, in public policy making, equal consideration for the interests of all persons subject to the government's putative authority. This approach offers an objective standard by which to assess the legitimacy of democratic rule, but does not take explicit account of the subjective experience of those who live in a putatively democratic regime. Even though democracy is a system of collective self-determination, its legitimacy cannot be entirely divorced from the opportunities democracy provides for the experience of individual self-determination as well. Constitutional theorist Robert Post has written: "[W]e could not plausibly characterize as democratic a society in which 'the people' were given the power to determine the nature of their government, but in which the individuals who made up 'the people' did not experience themselves as free to choose their own political fate" (Post, 1995, p. 7). That is why a full account of democratic legitimacy must embrace a second criterion: the degree to which the system supports the experience of individual citizens as autonomous actors free to participate meaningfully in acts of collective self-determination.

With these criteria in mind, there are three models of democratic legitimation widely known in the postindustrial West. The boundaries between these models are porous; a democratic system can easily incorporate elements of all three. But each of them rests on a different account of how citizens and institutions combine to afford democratic legitimacy. The accounts differ especially in the relative

importance they ascribe to individual citizens versus government officials in arriving at decisions of public policy.

The most familiar model of democratic legitimacy rests on the election of public officials to make and enforce the laws. For virtually all observers, elections are the sine qua non of modern democracy in any sizable community. In the election-centered model,[2] the experience of autonomous citizenship is focused on the selection of candidates and the electoral choice among them. When it comes to actually deciding the content of public policy, elected representatives are centrally important, but individual citizens only indirectly so. The system's claim to legitimacy thus rests on twin pillars. One is the hope that autonomous electoral participation will afford citizens a sufficient experience of self-determination to warrant their allegiance to the outcome. The second is the presumption that the accountability of representatives to the people who elect them will yield the equal consideration for the interests of all persons that provides democratic government with its moral foundation.

An alternative account of democratic legitimacy is typically called "direct" democracy (Cronin, 1999).[3] The practices that actualize the ideal of direct democracy are generally thought to come in two forms: One is "assembly democracy," typified by the town meeting, in which every adult citizen residing within the relevant jurisdiction is entitled to attend the meeting, help shape the agenda, and vote on public measures. More common, for obvious reasons of scale, are practices that, like candidate elections, are dependent on voting: the referendum and the initiative. In any case, direct democracy locates the moral entitlement of democratic government to rule in the capacity of citizens to determine for themselves the content of the laws that constrain their freedom. Because citizens experiencing these mechanisms are more likely than in candidate elections to "experience themselves as free to choose their own political fate," direct democracy has obvious appeal as a model of democratic legitimacy. On the other hand, it is difficult to see, however, how direct democracy promotes the equal consideration of the interests of all persons, which is thus a weakness of this model (Hamilton, 1996-1997).

A third model of democratic legitimacy has come to be called deliberative democracy. Under this model, democratic legitimacy is rooted in the position, as articulated by James Bohman and William Rehg, that "legitimate lawmaking issues from the public deliberation of citizens" (Bohman & Rehg, 1997, p. ix). "Deliberation," in theories of deliberative democracy, is a special form of rational communication operating in formal arenas and under specified norms (which, pursuant to deliberation, may become further specified). Mere political talk, although it may create a richer environment for deliberation, is not deliberation (Noveck, 2005).

According to virtually all theorists of this model, deliberation should ideally meet five criteria. The first is that the relevant deliberations must be open to all, and all who participate must be able to do so free of coercion. Second, each participant must be treated as an equal. Everyone can speak. Everyone has a voice in shaping the agenda. Everyone can raise questions, debate, and vote on outcomes. The third condition is rationality. Everyone who deliberates agrees to advance positions either by appealing to the common interest or by making arguments of a sort that all participants could accept. The fourth is reflexivity. Anyone can raise questions to the group about whether foundational norms are being respected. It is encouraged for speakers to reflect on their own biases. Finally, the reasons for ultimate decision must be public. They must be open to the scrutiny of all, in order that they can again become the subject of yet further deliberation (Cohen, 1997).

Deliberative democracy contributes to the equal consideration aspect of legitimacy in two critical ways. First, while the procedures of election-centered or direct democracy take the individual citizen and his or her preferences as given, it is accepted—even intended—that the processes of deliberative democracy will transform the perspective of the individuals who participate. In the words of Arthur Applbaum (2002), "A usable definition of deliberative democracy refers to processes and institutions that aim at changing motivations, and consequently outcomes, for the better" (p. 24). Thus, although also directly participatory in nature, deliberative democracy rests on ideas of self and identity distinctly different from those associated with initiative and referenda processes. Second, and relatedly, while the deliberative model resembles election-centered models in promising equal regard for the interests of all, such equal regard is achieved not in the accountability of decision makers to the governed, but in the very process of citizen deliberation. That is the fundamental accountability in deliberative democracy does not run from the governor to the governed, but from each citizen to every other. It is the phenomenon of mutual regard among citizens, with consequent impacts on each citizen's sense of self and collective political identity, that is the key instrument under deliberative democracy for assuring the equal consideration of all persons' interests.

There is yet a fourth possible account of democratic legitimacy, which I will call the managerial model. Some theorists argue that democracy ought be judged not by values of process, such as equal consideration, but rather by the substantive results that people care about, such as the promotion of economic prosperity, individual and

collective security, and social justice. The influential work of John Hibbing and Elizabeth Theiss-Morse (2002) even tries to show that citizens, at least of the United States, prefer government to be run more like an efficient business than a deliberative or participatory public sphere, as long as they get positive results. Dan Hunter (2004), expressing a similar notion, has written: "Democracy is an empty concept that describes few, if any, of our genuine political commitments" (p. 142). Our "genuine" commitments are presumably to the substantive goods that democratic government promises to achieve.

For democratic theorists, of course, it may matter quite substantially which of the foregoing approaches to political legitimacy is most persuasive. This is less true, however, for designers of digital government and electronic democracy initiatives. That is because well-designed digital initiatives can advance, often simultaneously, multiple models of legitimacy and, if digital government is truly to contribute to democratic revitalization, it is probably imperative that such an eclectic approach be followed.

## HOW DIGITAL GOVERNMENT INITIATIVES CAN SUPPORT DEMOCRATIC LEGITIMACY

With regard to each of the three better-known models of democratic legitimacy—election-centered, direct, and deliberative—a well-informed citizenry is plainly a critical element. Indeed, even with regard to the last, managerial view of democracy, citizens are likely to value information that confirms the effective performance of government. Because public access to politically significant information is thus critical to every theory of democratic practice, the importance of the Internet on this ground alone can hardly be overstated. Throughout the developed world, virtually every significant information outlet critical to predigital democracy, including broadcast and print media, along with every level of government now uses the Web to make vast quantities of policy-relevant information accessible to the public. Indeed, the very same information made available through the Internet becomes more valuable because it is likely to be stored and "served" to interested viewers for longer periods of time, and is frequently searchable through effective and convenient technology.

Among the most important categories of information is information about government activities that provide opportunities for citizen engagement. Digital government sites make it possible to share public meeting calendars, listing programs and policy-relevant events of interest open to the public. Combining such sites with e-mail notification services enables government units to keep citizens informed and up to date on the activities of agencies, boards, and commissions in which those citizens have expressed an interest.

To the extent democratic life revolves around candidate elections, the Web facilitates a wide array of activities around political campaigning, issue advocacy and debate, and the monitoring of elected officials and the candidates seeking to replace them. While online voting is still rare, digital government Web sites now provide potential voters with much more easily accessible information about polling places and ballots. Online voter registration is potentially an invaluable tool for expanding the qualified electorate. Web sites have multiplied to give information to voters regarding candidates, their positions, their records, and their contributors. Of course, virtually every digital government application with the potential to enhance the candidate election process would have counterparts with regard to those issue elections—initiatives and referenda—that stand at the core of so-called direct democracy. Web sites can enable sponsoring organizations and advocacy groups to organize volunteers and raise funds. If legally authorized, they can facilitate the signature-gathering process. Web sites can help inform voters about the content and implications of proposed ballot measures, as well as sharing the identities of who is advocating or opposing various propositions.

Most of the genuinely distinctive electronic democracy applications, however, are probably those associated with theories of deliberative democracy. For example, ICTs offer significant possibilities for improving those aspects of contemporary government that are already deliberative in nature. Online administrative rule making is the paradigm case. In the United States, new applications such as www.regulation.gov (Noveck, 2005) have made it immeasurably easier for citizens to petition for regulatory initiatives or changes, to review agency proposals and background data, to scrutinize the contributions of other commentators, and to offer additional data and argument (Brandon & Carlitz, 2002). It would be technologically straightforward for policy makers to convene online dialogues that could be designed to move yet further in the direction of full citizen deliberation.

Significant experimentation with online consultation is a global phenomenon (Coleman & Gøtze, n.d.). A few current or recently concluded English-language consultations are illustrative:

- In May 2002, a Joint Committee was established by orders of both Houses of the British Parliament to consider and report on a draft Communications Bill. The Committee commissioned an online forum, under the auspices of the Hansard Society and the

Parliamentary Office of Science and Technology, to assist in gathering a wide range of citizen views on the bill.[4]

- The so-called Environment Group of the Scottish Executive held an on-line consultation from June through October, 2002, under the title, "What Sort of Scotland do we want to live in?" which focused on sustainable development issues facing Scotland. The aim was to equip government ministers with input for a policy document preparatory to the 2002 World Summit in South Africa (Smith and Macintosh, 2001).
- The Information Society Directorate General of the European Commission conducted in 2002 and 2003 an online consultation based on a Commission staff working document concerning barriers to widespread access to new ICT services and applications made possible through "open platforms" in digital television and third generation mobile communications.[5]
- The Canadian Department of Foreign Trade and International Affairs hosts a web site to solicit public comments on Canada's trade policy agenda on an ongoing basis, and to obtain information on specific consultation initiatives launched by the Canadian government. The site includes not only directions for submitting comments relevant to a host of current consultations, but also background information on trade policy and access to results of past consultations.[6]
- The Government of New Zealand launched a web site to solicit and summarize public input regarding a national strategy on "biosecurity," defined as "the protection of New Zealand's economy, environment and people's health from pests and diseases."[7]

It seems clear that all well-designed digital government applications bolster, by definition, the managerial model of democratic legitimacy. These would include Web applications that facilitate efficient access to government services, applications that permit citizens to report problems and concerns directly to government officers and agencies, and applications that permit the tracking of ongoing administrative processes. The latter have been shown to have significant potential for reducing the reality and appearance of government corruption (World Bank, 2000).

It is arguable, however, that even those web sites that are oriented only to the delivery of services actually do more. That is, even if they do not directly foster citizen engagement in public policy making, they have an indirect role to play in strengthening election-centered, direct, and deliberative democratic ideals, as well. At the very least, this is because using ICTs to render government more visibly accessible and accountable to the citizenry potentially increases citizen confidence in the project of collective self-governance. Research on political engagement shows that a major rationale for political apathy is the sense that citizen involvement does no good; individuals cannot accomplish anything meaningful (Muhlberger & Shane, 2001). It is plausible that, as government increases its demonstrated willingness and capacity to address people's real needs, the visible possibility of accomplishing positive results through government will encourage people to become more involved in shaping what government does—thus furthering the more participatory models of democratic legitimacy.

## FUTURE TRENDS AND CONCLUSIONS

If the argument is right that all forms of well-designed digital government can make at least indirect contributions to deepening democratic legitimacy, does it matter to the future of democratic legitimacy whether democratic intentions actually play a significant role in the design of digital government initiatives? The answer is almost certainly, yes (Noveck, 2005). The forces responsible for citizen skepticism and alienation, described at the outset, are simply too strong for us to imagine that the mere use of ICTs to facilitate improved efficiencies in existing managerial practice will be sufficient to produce a significant revitalization of democracy. This seems especially so given the array of forces that make it difficult to advance the cause of participatory democracy (Shane, 2005). To facilitate effective citizen engagement, digital government designers must focus consciously on the potential of the Internet to become a significant vehicle for helping citizens to become well-informed, fully engaged partners in democratic public policy making.

For this reason, an especially exciting area of interdisciplinary research is focusing on how to integrate digital democracy initiatives with more conventional projects in digital government. Researchers are asking what it would take not only to engage citizen attention initially, but also to sustain that attention through online interaction. One can easily imagine government agencies augmenting their traditional face-to-face citizen outreach efforts with online meetings, e-mail services, and bulletin boards that foster the creation of online communities of citizens becoming informed contributors to agency policy making. The creation of online libraries of information for interested citizens could itself become a collaborative task involving both government officials and citizens engaged in deciding what information is needed and how it can best be presented in meaningful and accessible form (Shane, 2004b).

This vision, of course, poses very large questions: How can government attract and sustain citizen participation? How can public policy questions be framed and the stage set for informed and productive online deliberation? What are the practical issues of technology, organization and personnel that will arise for governments seeking to implement electronic democracy projects? How can government help to prepare all citizens to participate effectively in a world of electronic democracy? How can government help to establish and maintain norms of civil online discourse? How can electronic democracy tools and face-to-face civic interaction best be integrated? Partnerships between government and academic researchers designed to shed light on these questions offer perhaps the greatest potential for yielding insights helpful to those government units most intent on implementing digital government in a way that will deepen democratic legitimacy.

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## KEY TERMS

**Deliberative Democracy:** A model of democracy in which legitimacy is rooted in public deliberation among citizens as conducted in formal arenas and under specified democratic norms.

**Direct Democracy:** A model of democracy in which citizens participate directly in the formulation or approval of the laws and policies that govern them.

**Election-Centered Democracy:** A model of democracy in which political legitimacy rests on the accountability of elected representatives to the voters who choose them (also frequently called, "representative democracy").

**Electronic Democracy:** The design and deployment of information and communications technologies to strengthen democratic political practice.

**Electronic Rulemaking:** The practice, in the United States, of using the Internet to facilitate the collection and analysis of citizen input with regard to proposed administrative regulations.

**Managerial Democracy:** A model of democracy in which legitimacy rests on an elected government's capacity to provide citizens with security, economic prosperity, and social justice.

**Political Legitimacy:** The moral entitlement of any governmental entity to wield political power.

## ENDNOTES

1 An extended version of this chapter's argument appears in Shane (2004b), from which portions of this chapter are drawn with permission.

2 I prefer the term "election-centered democracy" to the more familiar "representative democracy" because, as I have argued elsewhere, representation is crucial to models of practicable models of "deliberative democracy" as well (Shane, 2004a, p. 80).

3 "Direct democracy" can also be considered a species of "participatory democracy," although I find the latter label potentially confusing, given that both representative and deliberative democracy obviously entail popular participation as well.
A species of "participatory democracy" that differs from each of the models discussed here is "associative democracy" (Perczynski, 1999), a model generally attributed to Paul Hirst (1994). Under Hirst's model and its offshoots, substantial responsibility for the governance of social life would devolve from the state to democratically structured voluntary groups. To the extent such governance could succeed without the exercise of state power, the problem of legitimating state power would necessarily be reduced. But by its very terms, "associative democracy" does not appear to be a distinct model for legitimating whatever exercise of state power would remain, which would still have to be justified by election-centered, deliberative, or direct democracy principles.

4 Materials regarding this consultation are available at http://www.commbill.net/.

5 Instructions for participating in the consultation are offered at http://europa.eu.int/information_society/topics/telecoms/regulatory/publiconsult/index_en.htm.
The underlying report is available at http://europa.eu.int/information_society/topics/telecoms/regulatory/publiconsult/documents/211_29_en.pdf.

6 Access to current on-line trade consultations is facilitated through http://www.dfait-maeci.gc.ca/tna-nac/consult-en.asp#Other.

7 The consultation web site appears at http://www.biostrategy.govt.nz/index.php. The draft strategy upon which comment is sought is available at http://www.biostrategy.govt.nz/library/draft-strategy/draft-strategy.pdf.

# Digital Government in Remote Locations

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## INTRODUCTION

All governments face difficulties in trying to ensure the full participation of every citizen. The further a citizen is located from the centre of power and administration, such as a capital city, the less engaged they are likely to be. This phenomenon can be observed at both a national and an international level. At the global level countries located in close proximity to major world markets are more likely to have well-developed e-government services, than more marginally located countries, particularly those with low population densities. Within individual countries, there is typically a marked variation between rural and urban areas both in terms of access to available infrastructure and uptake by citizens (Parker, 2000). In general, the more remote the location and the smaller the population density, the lower the rate of participation will be. This can be observed in even in the most highly developed, highly populated countries; for example, the Japanese government struggles to provide the often elderly residents of remote islands with government services (Hayashi & Hori, 2002). In a country that is less developed without easy access to major world markets, the effects on rural citizens are intensified.

The small island developing states of the South Pacific are some of the most remotely located nations in the world; their economies are relatively underdeveloped and they have low population densities. By researching the difficulties faced in attempting to implement e-government in some of the most distant corners of the earth, lessons can be learned about the way that information and communication technologies (ICTs) can overcome the barriers of geography. The insights gained from this exercise are relevant worldwide; as many economically developed countries also have pockets of population that are hard to reach.

A counter argument is that some of these differences may be attributable to a country's level of economic development rather than it's actual geographic location. A notable example of a remotely located country that has a highly developed e-government system is New Zealand. Despite having only four million inhabitants, and being placed on the other side of the globe from the major world markets of Europe and the USA, in 2001 New Zealand was nominated by the UN as the country with the third most advanced e-government system in the world (Boyle & Nicholson, 2003). ICTs now make it possible to connect a citizen in even the most far-flung location directly to central government services.

This article investigates the status of e-government in remote locations. Representatives from ten different South Pacific Islands were surveyed to discover what they perceived as the main barriers and opportunities in developing e-government in each of their different countries. The island states of the South Pacific have developed independently and are culturally diverse. However, they all share some common features with regards to adoption of ICTs. In order to appreciate these factors more fully, one country, Samoa, has been used as an example. By comparing Samoa with New Zealand, lessons can be learned about how to utilise ICT to overcome the disadvantages of distance and low population.

E-government is sometimes viewed as a subset of e-commerce. However, it needs to be remembered that there are substantive differences between the private and public sectors. Governments have a duty to make sure that services are available to all citizens, and usually the citizens who are the most needy are those who have the least access to government services (Curthoys & Crabtree, 2003). Often this is because such citizens live in remote rural locations. The public sector is a law-based system, and government includes many processes that are different from processes encountered in private sector settings such as retail or banking, for example: complex decision making; negotiations between stakeholders; policy formulation; and democratic participation (Lenk, 2002). An example is the highly contentious issue of land ownership in the South Pacific; the use of e-government could

*Table 1. UN-ASPA Five stages of e-government (adapted from UN & ASPA, 2001)*

| STAGE | DESCRIPTION | SPECIFIC FEATURES |
|---|---|---|
| **Stage One** | **Emerging Web Presence**<br>Static information on the government is provided | Postal address<br>E-mail address<br>FAQs |
| **Stage Two** | **Enhanced Web Presence**<br>Information is kept up to date, some documents can be downloaded | Updated regularly<br>Search function<br>Newsletters |
| **Stage Three** | **Interactive Web Presence**<br>Citizens can search databases, and submit online forms | Downloadable forms<br>Specialised databases<br>Discussion forum |
| **Stage Four** | **Transactional Web Presence**<br>Transactions can be completed online, and sites are fully secure | Public user log on<br>Online payment<br>Security policy |
| **Stage Five** | **Fully Integrated Web Presence**<br>A single customisable portal provides all services and links | Portal<br>Complete information |

potentially help land boards to demonstrate a fair and transparent approach to this issue.

## BACKGROUND

Samoa is an independent island nation in the South Pacific, with a long history of political and economic stability. The country has a land area of approximately 2,938 square kilometres, and a population of approximately 170,000. The Samoan economy is made up of agriculture, fishing, handicraft production, small manufacturing goods, and one automobile-wiring firm. Tourism has recently become a valuable contributor to the Samoan economy, and since 1990 has been the top foreign exchange earner. SMEs are central to Samoa's economic well-being comprising 98% of the Samoan economy.

New Zealand has been able to adopt e-government quickly due to a number of factors:

- It has a relatively simple structure of government compared to many countries
- A small population facilitates the quick spread of new ideas
- The population is well educated
- The country has a history of being an early adopter of innovative ideas (Boyle & Nicholson, 2003)

If Samoa is to learn from the example of New Zealand, any common features shared by both countries need to be identified and considered. Samoa also has some of these characteristics. As a small country, it has a simple governance structure. Though central government does consult with village mayors (Pulenu'u) and presidents of the village women's committees, there is no local government as such. This means that current systems of government are relatively easy to automate. Like New Zealand, Samoa has a low population density, which can be an advantage, in that provided internal communications are adequate, ICT-based strategies can be implemented more rapidly than in a larger country. However, a small population often means that there is a lack of appropriate skills to implement such policies (Comnet-IT, 2002). Samoa has its own University, and the educational level of the population is high for a developing country, with a 96% literacy rate, and two thirds of 15-19 year olds in education (Purcell & Toland, 2004). Despite this, there is still a shortage of the relevant ICT skills. Though a comparison between the two countries is useful, it does need to be remembered that New Zealand is much more economically developed than Samoa, and in terms of factors such as transport and telecommunications infrastructure, the two countries are worlds apart.

Recent research (Curthoys & Crabtree, 2003) has found that many governments have poured resources into developing e-government systems with mixed results. Despite the extensive development of e-government services in the UK, most citizens have continued to interact with government by traditional methods; as of 2002, only 11% of UK citizens had used a government online service. The conclusion that can be drawn from this is that to be successful e-government must be popular with its actual users, the citizens themselves. Governments need to consult with their citizens in order to identify services that citizens are likely to use online. Samoa has taken careful steps to involve rural as well as urban citizens in the development of its new ICT policy. The policy was built up through a bottom-up process of consultation at the village level, representatives of the National ICT Committee visited both rural and urban villages to collect the opinions of a wide range of people.

A number of frameworks have been developed that can be used to track the growth of e-government (Jupp, 2003). The UN/ASPA five-stage model, shown in Table 1, has been selected for this research as it clearly identifies each step of development. At stage one, the e-govern-

*Figure 1. Most frequent method used to contact the Government Department*

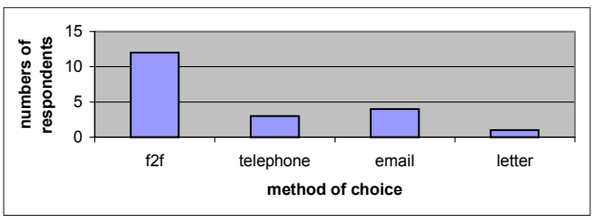
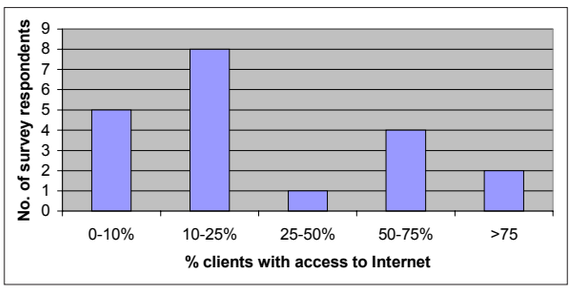



*Figure 2. Estimated percentage of external clients with Internet access*




ment presence consists of Web sites that provide fairly static public information. At stage two the Web sites will be regularly updated, some documents will be available for download, and e-mail will be present. Once stage three is reached, the government Web site begins to act as a portal with links to related sites, both government and non-government. At stage four, citizens will be able to complete transactions online, and Web sites will be secure. Stage five occurs when there is an integrated countrywide portal where all services offered by government can be offered through one integrated "one-stop shop" site (Lallana, Pascual & Soriano, 2002).

In the case of Samoa, most government departments now have Web sites (Purcell, 2003). However they are generally still at stage one of the model and are limited to advertising and information sharing only. Like other Pacific countries, government departments in Samoa use the Internet mainly for e-mail. The technology has not yet begun to contribute to efficient and effective procurement, as it does now with governments in developed countries.

## EMPIRICAL STUDY

To find out where South Pacific countries were on the UN-APSA model, and to assess the opportunities for, and barriers to progress, an exploratory study was carried out. This involved surveying attendees at a 2002 conference1 on ICT use in the Pacific region about their use of e-mail and the Internet. In parallel with this, a number of government Web sites from Fiji, Samoa, and Vanuatu were sampled for evidence of features derived from the UN-APSA model.

The attendees at the conference came from 10 different South Pacific countries. Some respondents worked directly for their countries' governments, while others worked for NGOs or telecommunications companies. The instrument used was an anonymous questionnaire, which queried the respondents' use of e-mail within the government, and between government and its external clients. Twenty individual respondents completed the questionnaire, a response rate of 75%. Respondents were asked whether their own organisations had Web pages, and what they used their government's Web pages for. Respondents were also asked to estimate what percentage of their clients had access to e-mail and the Internet. This was to confirm the information already collected about e-readiness, by establishing what access citizens had to ICT either as individuals in their own right, or through NGOs that might lobby on their behalf. In terms of the development of e-government, we sought to investigate communications between governments and organisations such as schools, NGOs, and utility companies. The survey was followed up with an open ended discussion in which focussed on the barriers, threats and opportunities stemming from e-government.

Figure 1 shows that the most common method used to communicate between a government department and an individual citizen is still face-to-face discussion. This was the method that individuals felt most familiar with, and it was seen as the best way to achieve results. The respondents who picked e-mail as their first choice method appreciate the speed and convenience it offers.

Individuals were asked to estimate what percentage of their external clients had access to the Internet. The results are presented as Figure 2. The findings confirm the results of an earlier UNESCO study (Zwimpfer Communications, 2002), with the majority estimating that less than 25% of their clients had access to the Internet. However, the feeling was that this number was increasing, particularly in the urban areas.

Seventy-five percent of the respondents worked for an organisation that had its own Web site. Most were regular users of government Web sites, with only two people reporting that they never used such Web sites. The most frequent uses of government Web sites were for general browsing, looking up contact details, downloading documents and sending e-mails. None of the participants had ever made a payment using a government Web site.

*Table 2. E-government: Barriers, threats, and opportunities*

| BARRIERS | THREATS | OPPORTUNITIES |
|---|---|---|
| Lack of commitment from government/ decision makers (9) | Security issues (3) | Improve transparency (6) |
| Lack of awareness of the benefits (8) | Could foster corruption (3) | Will be cost efficient/ cheaper (5) |
| Poor telecommunications infrastructure (8) | Use of ICT could replace jobs (2) | Will improve access to information for general public (5) |
| Lack of skills and knowledge (4) | Availability of sensitive materials (2) | Pacific people living overseas will have easy access to information (3) |
| High costs of hardware and telecommunications access (4) | Loss of income for telecommunications companies (2) | |
| Lack of regulations and policies (3) | | |
| Monopoly for telecommunication companies (2) | | |

The sampling of selected government Web sites confirmed these findings. Most sites featured documents to download, contact details for government departments, and FAQs (sites answering "frequently asked questions"). The more sophisticated sites also featured up-to-date news feeds, and search facilities. None of the sites sampled had online forms, featured portals, or included any facility for online transactions. Most of the sites were at stage one of the UN-APSA model (emerging Web presence), with a few at stage two (enhanced Web presence).

As a follow-up to the questionnaire, 26 conference participants from 12 different South Pacific countries discussed the barriers, threats, and opportunities to e-government. The main points submitted are summarised in Table 2. The numbers in brackets refer to the number of participants citing that item as a concern.

The major barrier to e-government was felt to be a lack of commitment from the governments of the respective countries. Respondents felt that the governments did not view e-government as an important issue. The poor telecommunications infrastructure, and a lack of awareness of the benefits, are also key barriers. The participants saw the main opportunities being offered by e-government as being improved transparency, better access for the general public, and cost- saving.

In 2005 government, Web sites in Samoa, Fiji, and Vanuatu were revisited to assess what progress had been made since the initial survey was carried out in 2002. In all cases there had been significant developments. In Fiji it is now possible to download application forms for civil service positions, showing that e-government is at Stage Two of the UN/ASPA model and is moving towards Stage Three. The government's Strategic Development Plan 2003-2005 explicitly commits it to developing both internal and external e-government applications. Internally about 3,000 (out of a total of 17,000) civil servants now have access to the Internet, and the objective is to connect 10,000. Externally the government intends to make the Internet available in all 19 public libraries. There are also plans to develop a dynamic Web site for the Immigration Department, which will allow customers to apply, pay for and receive immigration services online (Minges & Gray, 2004). This illustrates that the Fijian government has recognised the value of e-government, the major barrier to expansion of services is the high costs of telecommunications which makes it difficult to connect users located outside the capital city, Suva (Minges & Gray, 2004). In Vanuatu, government Web sites now have a range of features particularly aimed at attracting overseas users: potential tourists are able to book accommodation and tours online; potential investors are able to set up a company online. The ability to submit online forms in these areas means that Vanuatu is now at Stage Three of the UN/ASPA model. Samoa's government sites still contain mainly static information, and have not moved from Stage one of the UN/ASPA model. However the government is committed to developing e-government and a significant development is the introduction of a Mapserver system (Martin, 2005). This will feature geographical information from many government departments, regional and international organisations and will enable more informed planning decisions.

## FUTURE TRENDS

A number of Pacific island countries have a history of political instability, with the result that many citizens distrust their government. E-government is a tool that can be used to help build trust by making interactions between citizens and government more transparent, and reducing the possibilities for corruption. E-government

can help to transform government to be more citizen-centered, and to improve services to citizens. Information technology is a crucial driver of these improved services (The Working Group on E-Government in the Developing World, 2002).

As well as developing a shared vision with their citizens, governments need to develop partnerships with private businesses in order to move forward. For example, a major barrier to the development of online payment in Pacific island countries is the lack of a clearinghouse for the validation of credit cards. The Samoan government is offering incentives to the private sector to develop a central payment clearing system, which could be used by all Pacific island countries.

Poor telecommunications infrastructure is a common barrier among the developing countries. Samoa is no different. The poor condition of the infrastructure is due partly to the condition of the cables being used. Both the underground and aerial cables are old and deteriorated. The national telecommunications provider, Samoatel is working on improving this situation by laying down fibre-optic cable in Apia, the capital. Currently, about 80% of Samoans have access to at least a basic telephone, and Samoatel plan to have achieved 100% connectivity by the end of 2005. New developments in wireless technology open up the possibility of providing access to e-government without the development of costly infrastructure (Caldow, 2003). Telecom Samoa Cellular provides wireless communication in Samoa, and the prepaid mobile telephone is proving to be a popular method of communication (Vaa, 2003).

A key issue in establishing ICT connectivity between small islands is affordability. Travel in these countries is expensive often involving a combination of bus and boat journeys, therefore although sending an e-mail may be relatively expensive, the cost compares very favourably with the cost of a journey to the nearest government office. A long journey can be undertaken to reach the nearest telephone, only to find that the official you want to contact is out of the office.

## CONCLUSION

The findings show that while Web sites and e-mail are quite common in the public sector in the South Pacific, there is little transactive use at present, though this is increasing. The survey indicates that the main opportunity offered by e-government to the South Pacific would be increased transparency. In 2002, the low priority it was given by government was a major barrier. By 2005, governments were beginning to recognise the potential of e-government and were setting up projects to increase e-government services. However poor telecommunications infrastructure still remained a major barrier to progress.

Though it is useful to compare findings against an internationally agreed model, such as the UN-APSA model, what is important is not what stage of the model a country is at, but whether it is delivering services to its citizens in a manner they find satisfactory. Our findings show that online communications between government and NGOs are reasonably developed, and given the collective nature of South Pacific society it may be more effective to develop a model of e-government where an individual citizen's access to government is through an NGO acting as a facilitator, rather than aiming for direct government to citizen access.

Before e-government can be fully developed and implemented, there is an urgent need for such countries to develop a national ICT strategic plan to ensure that any ICT development—including e-government—is aligned to the country's overall national strategic goals. In 2004, the Samoan parliament approved a national ICT strategy. The overall vision is "information and communications technologies for every Samoan" (Samoa Information and Communications Technologies Committee, 2004, p. 2). This strategy built on the guiding principles outlined in the overall plan for the South Pacific region. This was developed by the Ministers of Communication in the countries which are members of the South Pacific Forum (Council of Regional Organisations in the Pacific, 2002). The plan has four guiding principles: up-skill human resources; develop infrastructure; facilitate cooperation between stakeholders and improve policies and regulations. The development of an appropriate telecommunications infrastructure is a particular challenge for small island developing states, due to the low population density, and the vast distances to be covered. The goal is to open up regulatory frameworks to allow competition, and encourage private sector participation in infrastructure development. A key role for the government will be to act as a role model in it's own use of ICT to link up government departments and corporations. This should encourage the private sector and NGOs to expand their use of ICT in interacting with their stakeholders (Samoa Information and Communications Technologies Committee, 2004). National ICT strategic plans can most effectively be developed and implemented by drawing upon partnerships among organisations, and collaboration among people across organisational borders.

Decision makers in South Pacific countries must be made aware of the benefits of e-government. In particular, they should understand that e-government could be a driving force to re-engineer and transform governance, and to better meet the needs of the country's citizens. The example of New Zealand shows how the innovative use of e-government can help to overcome the disadvantages of

remote location. Samoa has taken steps towards overcoming the barrier of lack of government commitment by developing an ICT strategy. The next step is to complete the upgrade of the telecommunications infrastructure so that full advantage can be taken of the benefits offered by e-government.

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## KEY TERMS

**FAQs:** Frequently asked questions.

**Joined-Up Government:** Seamlessly linking together different government departments, so that information is shared rather than being held in separate information silos.

**NGO:** Non-government organisation, a private non-profit making body, which operates independently of government. NGOs normally provide various forms of social services or community development.

**One-Stop Shop:** The idea that an individual citizen or business will be able to conduct all their business with government from one access point.

**Portal:** A multifunctional Web site that forms a gateway to a range of services that usually includes Web directories, search capabilities, and links to other Web resources.

**Transactive Use:** The ability to fully complete secure financial transactions online.

**Transparency:** Making the reasoning behind decision making open to all citizens to ensure fair play.

**UN-APSA:** United Nations and the American Political Science Association.

## ENDNOTE

[1] APT/PITA Regional ICT Workshop for the Pacific, Nadi, Fiji, November 11-13, 2002.

# Digital Government in the USA

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## INTRODUCTION

Recently, digital government is a prevailing concept in public sectors around the world. Regarding digital governments' contributions to the democratic administration or democratic society (Leigh & Atkinson, 2001), a fundamental question has emerged: How can e-government cultivate citizen participation and citizen competence for public affairs? This question stems from a more basic philosophical question on how we set the relationship between the state and the citizen in the information age (Beachboard, McClure, & Wyman, 1997).

The prevailing efficiency-oriented application of e-government has caused side effects and different opinions,[1] because digital government strategies just focus on information providers' interest rather than public interest, and focus more on the managerial side of the digital government than on substantial contribution to increasing citizen participation, citizen competence, responsibility or responsiveness, and transparency or openness (Dunleavy & Margetts, 2000; West & Berman, 2001; Cullen & Houghton, 2000; Relyea, 2002; Beachboard, McClure, & Wyman, 1997).

Digital government strategies mainly focused on providing information or simple transaction functions, and they did not pay much attention to interaction with people via digital government systems (Leigh & Atkinson, 2001). Therefore, it is not surprising that a new way of thinking of digital government is emerging, in terms of increasing democratic values like citizen participation and citizen competence for the democratic administration and democratic society (Relyea, 2002).

Since the White House established the Web in 1993[2], there are three perspectives on digital government strategies in the United States (U.S.): policy environment and operational requirements; chronological procedures; and the four-stage model (Relyea, 2002; Beachboard, McClure, & Wyman, 1997; Leigh & Atkinson, 2001; Layne & Lee, 2001). For example, Leigh and Atkinson (2001) explained the e-government development situation based on chronology. They divided the digital government of the U.S. into three phases: Using the Internet to share information (Phase one; 1993-1998), online transactions, service provision (Phase two; 1998-2001) and integration (2001-?)[3].

In addition, we can see digital government development with the four-stage model. Layne and Lee (2001) analyzed the e-government procedures with four-stage models based on state government in the U.S.: Catalog, transaction, vertical integration and horizontal integration. In the case of catalog, the initial efforts of government Web are focused on establishing an online presence for the government. With transaction as the second stage, digital government initiatives will focus on connecting the internal government system to online interfaces and allowing citizens to transact with government electronically. In the stage of vertical integration, for example, once a citizen filed for a business license at the city government, this information would be transmitted to the state's business licensing system and to the federal government to obtain an employer identification number. The final stage, horizontal integration, is defined as integration across different functions and services. Some scholars suggest there are four usage criterions for digital government strategies: information dissemination, social equality, privacy rights and public interests, with two broad criteria, such as information-content criteria and ease-of-use criteria (Kaylor, Deshazo, & Van Eck, 2001). These criteria have been applied to the assessment case study for the New Zealand government Web site in 1998 (Cullen & Houghton, 2000)

## BACKGROUND FOR DIGITAL GOVERNMENTS

According to the Office of Management and Budget (OMB) memorandum for *E-Government Strategy*, there are three aims in modernizing government: Make it easy for citizens to obtain service and interact with the federal government; improve government efficiency and effectiveness; and improve the government's responsiveness to citizens (OMB, 2002). Digital government offers the potential to deliver public services in a more efficient, more holistic matter, and improve a government's responsiveness to citizens' needs. Old divisions between governments, between tiers of government and even between the public and private sectors become increasingly irrelevant in the digital age.

Smart digital government should focus on the goal of helping citizens solve problems. Most people are not interested in which government agency, or even which tier of government, is responsible. Nor should they be.

Nor are they interested in bureaucratic acronyms and governmental self-promotion. Digital government should deliver services to citizens seamlessly and in a commonsense way, without requiring them to surf around to find the right Web site. Based on these substantial purposes that digital government has and the diverse approaches and the current usage patterns of digital government, we must reconsider how we understand the digital government, and what the substantial goals of digital governments should be. We can approach these basic questions through various theoretical backgrounds for digital government strategies. There are various theoretical models for digital government strategy: four-model by Dunleavy and Margetts (2000), two models by Glassey, and four stages models by Layne and Lee (2001).[4] In this study, I choose the Dunleavy and Margetts' model (2000).

### The "Digital NPM Scenario"

The digital NPM scenario was aimed at producing a dramatic displacement of demand from current physical services into electronic substitutes, with emphasis on substantial cost reductions for standardized public services and major cutbacks in public agencies' personnel numbers. NPM is focused on the disaggregation, competition and incentivization agenda, as well as cost-cutting potential, rather than on potential for enhancing quality of service or opening government to greater citizen accountability. From this approach, we can expect some negative impacts, such as: difficulty in making citizens appropriate recipients of corporate suppliers, strong resistance from small businesses and elderly people, digital divide and strong government mandating that citizens interact with them in particular ways. In other words, other forms of substantial costs have emerged in terms of damaging citizens' competence and levels of political involvement, along with a likely increase in policy complexity, as governments' remaining in-house capabilities for undertaking Web administration and Web-enabling hollow out.

### The "Digital State Paradigm"

This approach represents a different track, where radical Web-enabled change inside government replaces NPM as the dominant public administration paradigm. This approach works strongly against the fragmenting tendencies of NPM, and is much more integrative. In addition, Internet and Web changes are now one of the strongest forces for "joined-up government," for a "holistic" approach to data acquisition and utilization instead of the previously highly compartmentalized and non-communicating data "silos" of fragmented departments and agencies. This approach uses the Web as part of a process of continual organizational learning, making incremental improvements and testing effects on customers, which allows continual and rapid customer feedback; and entailing agency staff trying to get close to customers and use their feedback to reengineer public services. In addition, this approach dramatically enhances citizen competence and reduces policy complexity, and becomes the central operating tool of the whole organization, as well as the critical interface between government and society.

## INTERIM EVALUATION OF THE U.S. DIGITAL GOVERNMENT

Based on usage patterns of people in the U.S. and the theoretical backgrounds for digital government, the current appraisal results of the U.S. digital governments can be concluded. According to the Development Phase model, the U.S. is mainly in phase one and phase two, and in the field of criminal data integration, partly in phase three. According to four-stage models for digital government development, the U.S. is mainly in catalog/transaction with limited activities and vertical integration, in part based on different levels of government, such as criminal data integration. In addition, the U.S. is focused on economy-related activities rather than on broader public policy proposals, such as policy-related information dissemination or citizen participation. According to the United Nations (UN) assessment report on e-government readiness, among 191 nations around the world, the U.S. shows upper levels of ranking of government Web sites and online transaction services, but e-participation, citizen participation and feedback on policies still have a long way to go (see Figure 1).

Based on these appraisals, there is an emerging issue: Interactive communication and service delivery, in particular, require developers to re-think past assumptions and their own training and, on a daily basis, implement new and different ways of using rapidly changing technology (OMB, 2002). The result of this shift is that governments are using technology to present information in old ways and are also moving to develop new ways of presenting information and providing services for citizens. These changes will continue to occur as the public sector gains experience with and learns to exploit its potential. The phenomenon of the government on the Web promises to change how governments interact with their citizens, how the democratic process unfolds (Stowers, 1999; Beachboard, McClure & Wyman, 1997; Layne & Lee, 2001).

For this reason, some scholars suggested that we have to reconcile the incoherent directions of develop-

*Figure 1. The interim evaluation of e-government of the U.S. (UNPAN, 2004)*

| E-Readiness | Interactive Service | Online Transaction | Quality & Relevance of E-Participation | Encouraging Citizen Participation | Feedback on Policies | Online Consultation Facility |
|---|---|---|---|---|---|---|
| 91.32 * (1st) ** | 100 * (1st) ** | 92.68 * (1st) ** | 68 * (2nd) ** | 41 ** | 20 ** | 11 ** |

** Score ** Comparative ranking of countries.*

ment between NPM initiatives and digital government strategy (Dunleavy & Margetts, 2000).

## BARRIERS TO THE "DIGITAL STATE PARADIGM" IN THE U.S.

The digital state paradigm can be seen as a new approach for current digital government strategies, since the current digital NPM scenario has already pointed out some critical problems (Leigh & Atkinson, 2001; OMB, 2002) and the necessity of "digital state paradigm" has been suggested as a new way of thinking for better digital-government. In this article, I will suggest some barriers to improving the "digital state paradigm" in the U.S.

First, "stovepipe" structures of digital government (Leigh & Atkinson, 2001) "Island of Automation" (OMB, 2002) are prevailing in the U.S. Too many government Web sites still require users to know which agency delivers the service they are seeking (Legal, 2004). Government Web sites only list information provided by the agency. Leigh and Atkinson (2001) also pointed out the limitation of the chief information officer (CIO) at all levels of government, because they have narrow-minded perspectives focusing on their own departments or agency rather than integration or information sharing among organizations.

Second, portals of digital government are focusing on programs and politicians (Leigh & Atkinson, 2001). Although the role of digital government is to help citizens, too often, digital government seems to be a publicity portal for programs and politicians. The worst Web sites give top billing to a photograph of the governor or secretary with the latest press release from the agency highlighted. They then proceed to list their own government programs, often with indecipherable acronyms. Third, portals are unfriendly to the user. Web sites need to be designed with an intuitive interface, making them easy to navigate. Instead, too many are confusing and unfriendly, particularly once the user goes a level or two past the opening page. The different database structures and languages also contribute to more unfriendly portals.

Fourth, search engines of digital government do not work smoothly. When you try to use a search engine, you are more likely to be presented with reports, financial statements and press releases about specific issues than useful text on how to get information you want. In other words, many Web sites are not properly divided into a core database system. Fifth, digital governments are focusing on efficiency rather than on citizen participation. Digital government strategy based on NPM focuses on the managerial aspects of e-government strategy rather than on citizen participation or open governments (Dunleavy & Margetts, 2000). Even though some studies show that there was no closely related correlation between information technology (IT) spending and organizational efficiency in the United Kingdom (UK) and the U.S., a lot of published purposes or goals are still mainly focused on cost reduction and efficiency using digital government strategies.

Sixth, policy usage of digital government is still insufficient (OMB, 2002; UNPAN, 2004). Many government Web sites lack policy usage. Instead, they focus on information-providing from the perspectives of the providers. The government Web sites rarely provide policy usage except when providing budgetary information. Some government Web sites tried to use the Web as the means for policy usage, but still there is much more room for policy usage.

Seventh, there is insufficient time and resources for implementing digital government strategies. To implement digital government strategies, governments need a lot of time and resources, but the replacement of leaders by election on a regular basis and limited resource allocation influenced by economic circumstances make digital government strategies work in reality. Finally, a lack of clear policies and guidelines focused on effectiveness is another barrier for implementing digital government strategies. Although electronic media may seem to provide universal access to information and specifically to government information, without clear policies and guidelines focused on this outcome, the citizen's access to information, and the government's accountability for information provision, may be reduced rather than enhanced.

In addition, there are many barriers to government information—physical, economic, intellectual and technological—that may impede citizens' participation in democratic processes of their own nation and society (OMB, 2005). These barriers might be actively impeded

by government, or they may be allowed to continue simply through lack of action by government. The same barriers can also impede intra-governmental information flows.

## FUTURE TRENDS FOR E-GOVERNMENT IN THE U.S.

First, digital government will increase the importance of e-democracy. Clear goals and purpose for e-democracy will reconcile efficiency and citizen participation (Leigh & Atkinson, 2001). For this purpose, each government's strategic plans, including the OMB memorandum for digital governments, should be revised, giving priority to the policy usage or electronic citizen participation. In particular, bureaucracies should have the more positive perspective on information sharing and open government, because this kind of strategy will, in turn, contribute to improving efficiency and stability of policy implementation. We have to consider that we can use the Web for strategic planning teams, including current public officials, when we are setting goals and purposes. In addition, we have to make a coordinating environment between agencies' line managers and Web master when we establish a government Web.

Second, a one-stop shopping concept will be applied to e-government strategies. Ideally, a citizen should be able to contact one point of government and complete any level of governmental transaction. From the viewpoint of all levels of government, this could eliminate redundancies and inconsistencies in their information bases for citizens (OMB, 2002). For this purpose, governments should establish horizontal integration as well as vertical integration, including private sectors. We may consider that the central CIO, such as e-envoy in the UK, is needed for coordination and giving guidelines to all levels of governments in the U.S.

Third, the importance of up-to-date information and securing digital government usage by the people will be increasing. Accuracy includes timing for appropriate and useful information and correctness of the information provided by e-government. These characteristics are related to confidence in the government, so checking for accuracy and up-to-date information are considered in the digital state paradigm.

Fourth, personalized pages will prevail to make pages convenient and users feel secure. One way corporate Web sites encourage repeat business is by allowing users to personalize their viewing by identifying their particular interests. Government Web sites can use the same technology to make life easier for users. For example, North Carolina's Web site allows users to create a login and password and customize how the page appears by identifying the categories of information they are interested in. OpenGov.com, a Web site of the UK, has used these kinds of Web pages.

Fifth, digital governments will make a greater variety of interactivity—ways to actively increase citizen participation and citizen competence in using digital government strategies (Leigh & Atkinson, 2001; Holzer, Hu, & Song, 2004). There are several patterns for interactivity, such as e-mail addresses; comments; soliciting inputs; complaints; and service requests. In addition, computer conferences or full discussion areas using digital government have to be introduced more broadly and frequently. Recently, an interactive Web-based survey tool developed at the University of Illinois at Chicago was applied to advance a community planning process.

Finally, the processes of e-government implementation will be monitored or evaluated with The E-Government Act of 2002. With this monitoring, e-government strategy as well as implementation will be evaluated by OMB regularly (OMB, 2005).

## CONCLUSION

There are several critiques of the U.S. digital government strategies, because these focus on digital NPM strategies, emphasizing the managerial side for improving efficiency rather than increasing interactivities like public participation or public competences. These criticisms forced the creation of a new alternative for digital government, and the digital state paradigm is being considered as a new alternative for digital government strategy. The digital state paradigm focuses on closing the distance between state and society through interactive ways and participation, open government and making more democratic political procedures in policy-making and implementations. As a way of improving the digital state paradigm, barriers for it should be addressed. However, the new approaches to digital government focusing on the digital state paradigm do not say that we do not need to consider the managerial perspectives of the digital government; rather, both parts are reciprocally supplemented.

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## KEY TERMS

**Citizen Competence:** The capacity of the people to understand what happens around them and within the society, as well as the ability to decide some social issues with appropriate information and sound judgment.

**Digital NPM Scenario:** Focusing on the managerial side of digital government strategies as a way of increasing efficiency and productivity of public services.

**Digital State Paradigm:** Focusing on the bridge between state and society via digital government strategies and emphasizing citizen competence and trust through mutual communication between the state and the citizen.

**Four Models of E-Government Evolution:** Explaining e-government evolutions in four stages: Emerging level, enhanced level, interactive level and transactional level. Recently, a seamless level has been added as the fifth evolutional level of e-government.

**One-Stop Shopping:** Providing related Web sites to easily access necessary information and useful service through visiting one portal or Web site.

**Stovepipe Structure:** A structure of the digital government that focuses on each department and only lists information provided by the agency without considering integration or information sharing among organizations.

**Transaction Function:** Carrying out some government services electrically without visiting the public places that provide diverse governmental services to the people. For example, transaction functions include paying taxes using the Internet, renewing driver's licenses via the Internet and issuing some documents without visiting the public offices.

## ENDNOTES

1 One research result claimed that there are two kinds of cost shifting rather than cost saving: E-government strategy needs a huge amount of investment both in government and individuals for preparing this plan, and has caused a serious accessibility problem that we called "digital divide." The other example of cost shifting is from government budget to the individual's time and perseverance. In addition, the author considered the privacy problem, privatization and so forth. For more detail, see Jacobs, J., & Peterson, K. (2001). The technical is political. *Of significance, 3*(1), 25-35.

2 Some scholars claim that the beginning of e-government based on the Web was the establishment of the White House Web site in 1993 and Congress in 1994. For more detail, see Leigh, A., & Atkinson, R. D. (2001). Breaking down bureaucratic barriers. *Progressive Policy Institute's project report*.

3 According to Karen Layne and Jung-woo Lee, they divided digital government development into four stages: catalog, transaction, vertical integration and horizontal integration. For more detail, see Layne, K., & Lee, J-W. (2001). Developing fully functional e-government: Four stage model. *Government information quarterly*, *3*(18), 122-136.

4 For more detail, see Layne, K., & Lee, J.-W. (2001). Developing fully functional e-government: Four stage model. *Government Information Quarterly, 3*(18), 122-136. Also see Glassey, O., *Model and Architecture for a Virtual One-Stop Public Administration*, Switzerland.

# Digital Government Online Education for Public Managers



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## INTRODUCTION

The opportunities that arise from the practice of digital government continue to increase. Public managers responsible for adopting and implementing such new practices will be searching for existing best practices to incorporate into their respective communities. They may choose to rely on their information and communication technology (ICT) departments to develop necessary digital government applications, but an appealing option for public managers is to familiarize themselves with the most recent digital government applications through Web-based courses. Online education eliminates distances, allows for flexible scheduling and can incorporate current best practices of electronic-government on a timely basis.

Public managers play a critical role in the development of digital government initiatives (Halachmi, 2004; Heeks, 1999; Ho, 2002; Melitski, 2003; Weare, Musso & Hale, 1999). Although public managers can refer to numerous individuals within government municipalities, in the case of digital government, the chief administrative officer (CAO) is often the key individual in deciding the direction of government initiatives. By completing Web-based courses, CAOs can assess and strategically plan for effective and efficient digital government in their communities. Melitski (2003) argues that there is a need for public mangers that are "familiar with both IT and the programmatic goals and missions of public organizations" (p. 389). With respect to implementing digital citizen participation in government, Holzer, Melitski, Rho, and Schwester (2004) state, as their primary recommendation, "governments should work harder to identify, study, and implement best practices" (p. 28). The means to study such best practices, however, have generally been scarce, and the literature has been limited to specialized e-government reports and articles. But Web-based courses now offer the means for a CAO or any other public manager to study digital government practices and theories in a more effective and convenient manner.

## BACKGROUND

In order to optimize their city's e-government performance, public managers now have opportunities to educate themselves via a growing number of courses that address digital government in public administration and management programs. Some of these courses are also being offered online; however, Web-based courses that focus on digital government's opportunities and challenges are still rare. Web-based education, which is also termed online education, utilizes the Internet to deliver distance education.

Web-based education involves two types of learning: asynchronous and synchronous. In asynchronous online education, students do not need to interact with the instructor in real time. Students can complete a Web-based course on their own time and schedule. Asynchronous online education currently dominates Web-based education because of the advantage of individual control of time (Kim, 2004). Synchronous online education has an advantage when geographically dispersed students and the instructors interact in real time using communication technologies such as digital audio, digital video, and text-based messaging software (Martinez, 2004). Synchronous education is more popular in academic programs than in training programs (Kim, 2004).

Web-based education results in significant, positive outcomes, so that institutions need to learn "how to leverage the technological resources in curriculum and course design, student access and support" (Mayadas, Bourne, & Moore, 2002, p. 9). Web-based education requires effective tools to create, manage, and deliver content and collaborative activities. For that reason, "the selection of a course management system, which uses

templates designed for Internet-enabled instruction, is important in developing online courses" (Kim, 2004, p. 279).

Web-based education is increasingly utilized by academic institutions as a hybrid teaching approach in order to support face-to-face teaching and learning. Further, the United States government has attempted to develop advanced distributive learning initiatives through online education. However, these Web-based courses are typically limited to students within academic programs, whereas public managers may be seeking in-service courses about government's opportunities and challenges. One approach is certificate or continuing education programs for public managers. For example, the National Center for Public Productivity (NCPP) offers an online *Certificate in Public Performance Measurement,* with five-week modules such as "E-government and Citizen Participation" (NCPP, 2004). This certificate program includes practitioners, academicians and students. Designed as one-credit courses, these modules are built around course readings, case studies and online discussions. The e-government and citizen participation module addresses issues and opportunities of digital government, and provides case studies. The following five subject areas are based on this certificate module, and may serve as a model for similar Web-based courses in other venues.

## DIGITAL GOVERNMENT INITIATIVES

One of the first objectives that any course on digital government should cover is the various definitions, initiatives and forms of practices. E-government, digital democracy and digital divide are just a few of the terms that should be defined at the onset and then further developed throughout the course. This encyclopedia is an ideal reference for such courses as it includes definitions and developmental perspectives on digital government. The following readings can complement the Encyclopedia as they incorporate cases and studies relevant for municipal digital government. Melitski (2004) provides a thorough overview of e-government, including definitions and distinctions used in the public sector. O'Looney (2002) outlines some of the possibilities of a digital government for public managers, while Ho (2002) identifies typical initiatives among local governments. Moon (2002) highlights the status of e-government in relation to its expectations.

## DIGITAL GOVERNMENT CONSIDERATIONS

Following a grasp of the terminology and practices of digital government, organizational capacity and the digital divide should be addressed. The ability to practice e-government is dependent on the organization's capabilities and the community's resources for interacting digitally with government. Chen and Perry (2003) and Melitski (2003) address issues of organizational capacity and outsourcing for e-government. But the capacity to reach the community must be complemented by an understanding of the digital divide. If certain populations within a community lack Internet access or Internet-related skills, then the utilization of e-government services will be limited. The U.S. Department of Commerce (1999) has produced a report that outlines various issues associated with the digital divide: households without computers, access to the Internet, and the method of Internet access. Samuel (2002) looks at strategies to move beyond the divide: effective uses of public access points, facilitating computer purchases, and making Internet access more affordable.

## CITIZEN PARTICIPATION AND DIGITAL DEMOCRACY

An area that often reflects more advanced practices of digital government is citizen participation. Active and equal participation in government by citizens via the Internet is a necessary basis for digital democracy. Kakabadse Kakabadse, and Kouzmin (2003) discuss democratic governance through information technologies. This is part of a larger debate centered on the concept of a digital or electronic democracy. West (2004) looks at the transformation of service delivery via e-government and the resulting attitudes of citizens. The ability to include citizens in government is not limited to service delivery, but can expand to citizen involvement in the decision making process. Holzer et al. (2004) look at the possibilities of digital citizen participation for "restoring trust in government." Online discussion boards, real-time chat rooms, and e-mail exchanges with elected officials are just a few of the means by which citizens can actively engage government, and exemplary cases of digital citizen participation can be found at every level of government.

## DIGITAL GOVERNMENT BEST PRACTICES

Case studies should reflect local, state and/or federal government practices, depending on the course participants. Regular studies survey digital government practices annually with reports highlighting particular areas where governments excel or fail. One such e-government survey at the local level is done annually by the Center for Public

Policy at Brown University. West (2003) reports on the research done by this Center with an analysis of the most populated urban areas within the United States. The Center for Digital Government does an annual study at the state level: Digital States Survey (2003). Holzer and Kim (2004) at the National Center for Public Productivity and Sungkyunkwan University have developed extensive survey instruments (92 measures) to evaluate digital governance throughout the world and will replicate that bi-annually. In addition, individual case studies such as Kim and Lee (2003) look at the success of the Seoul metropolitan government's Open System, as do Holzer and Kim (2002). Other studies of current digital government projects include those done by the Organisation for Economic Co-Operation and Development (OECD, 2003) and United Nations Development Programme E-government Primers (Pascual, 2003). Individual cases also allow for specific comparisons and challenges that public managers may encounter.

## DIGITAL GOVERNMENT AND PUBLIC MANAGERS

The final week of the module allows CAOs the opportunity to design a framework for exemplary digital government practice in their communities. There are no assigned articles or case studies for the week, allowing time for a final project. This project is expected to include the concepts discussed throughout the module. In addition, the best practices studied in Week IV will provide specific examples for public mangers to use in their designs.

## FUTURE TRENDS

The potential for online education of digital government depends on the courses being designed to meet the needs of public managers. The modules used in the *Certificate in Public Performance Measurement* are designed to cover various topics in a short period of time. They include weekly papers, weekly discussion topics, and 2-4 readings a week. The following module is limited to 5 weeks. The following outline provides a general structure of a course in digital government using readings such as those previously suggested.

- **Digital Government Initiatives:** Would you define digital government differently at a local level as compared to national government practices?
- **Digital Government Considerations:** Is the digital divide an issue that CAOs should be held responsible for in communities where digital government is practiced?
- **Citizen Participation and Digital Democracy:** Define in your own words what digital democracy entails and its potential in the next decade.
- **Digital Government Best Practices:** What challenges may survivors face in studying different e-government practices throughout regions?
- **Digital Government for Public Managers:** Beyond those cases discussed in the readings, are you familiar with any digital government practices that are exemplary?

## CONCLUSION

The 5-week module was based on an existing course offered by the National Center for Public Productivity; however, additional courses can and should be developed that address the specific issues that are discussed in this Encyclopedia, focusing on capacity, planning, and development of digital governments. The medium of the Internet offers great opportunities for public managers and scholars to stay current on contemporary practices and issues. Digital government holds a great deal of promise for a truly digital democracy. To reach such expectations those responsible for implementing such practices must become knowledgeable as to the subject. Web-based courses for public managers on digital government can provide insight to current scholarship and best practices throughout the world. Online courses must also meet the needs of public managers, and as the outline above has exemplified, this can be done through short and direct course modules.

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## KEY TERMS

**Digital Citizen Participation:** The active participation of citizens in government or organizations with the use of ICTs.

**Digital Democracy:** Government information dissemination to and participation by citizens via ICTs.

**Digital Divide:** Refers to segments of the populations lacking Internet access or Internet related skills.

**Discussion Boards:** Online communication forums among groups/communities categorized by specific topics or questions.

**Chat Rooms:** Online discussions that occur at real-time, unlike discussion boards that occur over longer periods of time.

**ICT:** Information and communication technology, often used in reference to such technologies such as the Internet.

**Web-Based Courses:** Also termed online education, utilizes the Internet to deliver distance education.

# Digital Information Kiosks



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## INTRODUCTION

The word "kiosk" is derived from the Turkish word "kösk," meaning an open summerhouse or pavilion. Before the arrival of computer technologies, a kiosk was a small, rugged standalone structure often used as a newsstand or bandstand in public places. As early as the 1870s, kiosks could be found in the streets of Paris for displaying theater and gallery advertisements.

The advancement of information technologies in the 20th century gave information kiosks a new meaning. Instead of being simple post-boards for printed materials, digital information kiosks now provide not only easy and convenient access to information, but also transactional services that traditional kiosks could not perform. As the scope of digital government continues to expand, digital kiosks are becoming an important platform to support a wide range of e-government strategies.

## BACKGROUND

For the past decade, many policymakers and managers have been excited about the potential and promise of "e-government." By putting transactions and public information online, a government can give citizens and businesses more convenient and flexible access to public services and more direct interaction with public officials. This also offers significant cost-saving potential by reducing the need for office personnel and office space.

It is therefore not surprising that many governments have expanded the scope of e-government services tremendously over the past few years, especially in the areas of information provision, online feedback and complaint forms, license applications, and fee payment (Cook, 2000; Ho, 2002; Moon, 2002; West, 2000, 2002). At the same time, inequitable access to the Internet and technological opportunities among different population groups, which is sometimes known as the "digital divide," has become a rising social concern. Past studies have found that minority populations and households with lower income and less education tend to have fewer opportunities to access computers and use Web-based services (Bertot, 2003; Wilhelm, 2000). If traditional access to public information and services is gradually replaced by online platforms, those population groups who have less access to the Internet will be disadvantaged not only in public service usage, but also in their opportunity to voice their opinions and participate in democratic governance.

These are some of the reasons why public officials have expressed an increased interest in kiosk technologies in recent years. Many policymakers realize that, in addition to Web site development, part of their e-government strategy should focus on how the government can provide more equitable access to online information and services, and one of the tools to accomplish this goal is digital information kiosks.

## DIGITAL INFORMATION KIOSKS

A digital information kiosk is a computer-based device that provides an interface medium between users and a service or information provider with features designed to make it suitable for the general public (Sargent & Mclvor, 1996). It is usually composed of a hard outer shell, an internal computer, and a monitor that enables users to make selections using a touch-screen or keyboard (see Figure 1). Since the device is expected to withstand high traffic, long hours, and potential user abuse, it is specifically designed to include some fail-safe and energy-saving features, provide only limited functionality and user access, and contain stronger physical protection of the equipment. Some kiosks also have special visual or audio effects to catch the attention of the public so that certain information or advertisements can be disseminated more effectively. In addition, some kiosks are equipped with Braille instructions or voice enunciation to serve the needs of the disabled.

With the advancement of information technologies, digital information kiosks can now perform functions that traditional kiosks could not do. Traditional kiosks primarily play the role of information dissemination by posting posters or notices on a board for passers-by. The commu-

*Figure 1. A digital kiosk unit deployed by the U.S. Department of Housing and Urban Development*


nication between the information provider and readers is one-way, and the latter only play a passive role in determining what information they receive. Digital kiosks, on the other hand, can go beyond this by offering interactive or transactional services. For examples, many digital kiosks have an interface where a user can make a choice of content by pushing the buttons on a touch-screen or filling out a form using a keyboard. Some kiosks that are equipped with a credit card reader or a cash taker can also support financial transactions, such as buying tickets, paying fees, making deposits or withdrawing money.

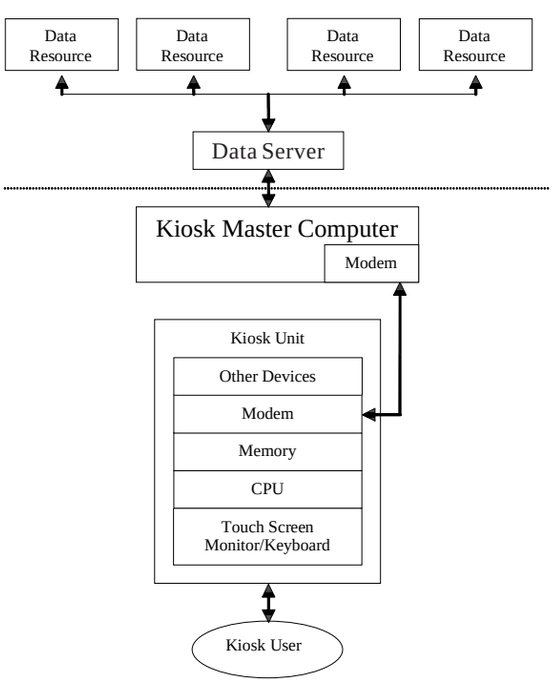
In general, digital kiosks can be grouped into the following three major categories (Morris, Sanders, Gilman, Adelson, & Smith, 1995; Ni & Ho 2005; Tung & Tan, 1998):

- **Information Dissemination and Advertising Kiosks:** These kiosks are primarily used for information display and can be commonly found in trade conferences, showrooms, tourist spots, and visitor centers. Users may request information through a touch-screen monitor, or use voice-activation to navigate through the information menus. Proximity detectors may also be used to automatically start an advertisement module with sound and video when a potential customer is close to the kiosk.
- **Interactive Information Kiosks:** These kiosks allow two-way communication between the provider and users in order to both automate information access and collect information. They can be found in high pedestrian traffic areas, such as airports, stores, malls, and convention centers. Users may input information, such as names, codes, or dates, through a touch-screen or, less frequently, with a keyboard. Hard copy output, such as maps and coupons, can be provided if the kiosk is accompanied by a printer.
- **Transaction Kiosks:** These devices are relatively more advanced because they allow for more complex and secure transactions and information exchange. Kiosks of this type can access and update databases, and require personal identification for transactions. Besides a touch-screen or a simple keyboard, transaction kiosks need additional room and security features to allow them to accept cash or credit or debit cards.

While an advertising kiosk or a data collection kiosk may contain all the information and services internally in its hard drive, it is more common to connect the machine with a computer network. The latter allows instant update of information by content providers, enables more effective monitoring and control, and reduces maintenance burdens and administrative costs. A typical kiosk network contains the following components: one or more servers, an operator workstation, telecommunication equipment, and kiosk computers and related devices (see Figure 2).

Kiosk network technologies have existed for a long time. In the private sector, for examples, financial institutions have deployed automatic teller machines (ATM), an early form of transaction kiosks, for decades. Some retail stores have also used kiosks to provide customer and product information (Rowley & Slack, 2003). In recent years, many airlines have used digital kiosks to let passen-

*Figure 2. Kiosk system data flow (Ni, & Ho, 2005)*



gers do their own check-ins to simplify the process and cut cost (Melnick, 2003).

Hence, the public sector is relatively behind on the technology adoption curve and is trying to catch up. The recent interest in kiosk technologies for public sector applications is motivated by both economic and policy reasons. First, similar to the rationales for private industries, the government wants to adopt the technologies to cut administrative costs and paperwork. Kiosks can be used to substitute for or complement a human information agent. Although a kiosk system still involves maintenance and development costs, a government agency may save a considerable amount of salary, benefit, and insurance costs in the long run because these expenditures have been rising rapidly for the past decade.

Kiosks can also help handle the peak hours demand for services, such as during early mornings, lunch hours, and late afternoons, when many citizens may come to visit the government office to avoid interrupting their normal work schedule. Kiosks can be used to handle some of these citizens' requests for services and reduce the need to hire additional or temporary labor assistance. This not only creates financial savings, but also allows public managers to avoid collective bargaining and other personnel regulations and have greater flexibility in deciding when and where to deploy a service, and when they may terminate it.

In addition to economic reasons, there are also policy reasons why many government agencies are looking into the kiosk technologies. As a result of the reinventing government movement and the wave of new public management, many agencies are emphasizing the need to provide better customer services and more convenient access for the public. Digital kiosks therefore become a natural solution to this goal, as many services, such as license applications and renewals, fee or fine payments, and access to government forms and public information, can be obtained through kiosks without the limitation of office hours and office location (Kitfield, 1994; Maxwell, 2001; Walsh, 2000). In addition, public officials can collect information about citizen preferences almost instantaneously through kiosks. By analyzing what kiosk services citizens browse and use, public officials can use data mining techniques to identify service priorities and tailor service provision that better fits the citizen demand (Hill, 1997).

Furthermore, by placing digital kiosks strategically in disadvantaged neighborhoods, community centers, and schools, a government can use the technologies to address the problems of the "digital divide." Kiosks are especially helpful in addressing the information needs of the disabled and certain minority populations who are less comfortable with the dominant language in a community. By equipping kiosks with multi-language options and voice-activated instructions, a government agency can reach out specifically to these population groups so that they receive equal access to various e-government services.

## FACTORS INFLUENCING THE SUCCESS OR FAILURE OF DIGITAL KIOSK PROJECTS

No matter how great the potential benefits of a kiosk system might be, the ultimate social and economic benefits of the system are determined by how much they are used. The degree of usage depends on seven factors: location, applications, ease of use, aesthetics and ergonomics, structure, and security (Hill, 1997; Morris, et al., 1995; Tung & Tan, 1998) (see Table 1). Kiosks need to be placed in high traffic areas that are safe and convenient

*Table 1. Evaluation metrics for kiosk system*

| Factors | Metrics |
|---|---|
| Location | • High traffic flow<br>• Convenient access |
| Applications | • Matching the type of kiosks<br>• Suitable for the targeted users<br>• Versatile to meet the various needs of targeted users |
| Ease of Use | • Intuitive and consistent interface<br>• Easy application navigation<br>• Simple data entry<br>• Clear and concise instructions<br>• Fast response |
| Aesthetics and Ergonomics | • Unobtrusive to the environment<br>• Comfortable touch screen or keyboard position<br>• Durable interface and cabinet design against environment stress |
| Structure | • Modularized structure for easy replacement of parts |
| Security | • Protected from theft and vandalism<br>• Uncompromising confidentiality of users' information or transactions |

to citizens. They also need to provide services that have high demand but are constrained by the personnel capacity or the physical location of an agency. The design of the kiosk interface should be intuitive, clear, and consistent, and the physical design should be friendly not only to users but also to the maintenance crew. If the kiosks are to perform financial transactions, how to ensure network security and protection of the users and the machines from theft and physical harm are also important.

In addition, how to manage a kiosk system is also critical. Many past kiosk projects failed because the governments failed to budget for the full costs, did not have effective cost control and monitoring of private contractors, overlooked the importance of cost-recovery and marketing strategies, and did not retain sufficient financial and technical capacity to sustain a system in the long run (Ni & Ho, 2005). Therefore, the following are critically important in managing a kiosk project (Hill, 1997; Ni & Ho, 2005):

- Identify the targeted user groups and develop a reasonable estimate of the potential demand for the services
- Develop a clear strategic plan that specifies the rationales and goals of the kiosk system and the deployment phases and strategies
- Develop specific action plans that define who should be responsible for maintaining and financing the services after the system is launched
- Develop a team approach in the design of the system by involving all relevant agencies, vendors, and other internal and external stakeholders
- Develop a full budget that covers not only the initial development costs, but also the maintenance and operating costs over the use life of the system
- Investigate and evaluate thoroughly different kiosk technologies available in the market, including their costs and technological cycles; avoid the newest technologies that may not be fully tested, and at the same time, beware of the problems of using technologies that will be phased out in the near future as they may create a lot of maintenance difficulties
- Develop clear performance goals and monitoring standards for private contractors if they will be used
- Develop a marketing plan to increase the public awareness of the services

## FUTURE TRENDS

In many developed countries, digital information kiosks are commonly found in public places, such as in libraries, museums, airports, and highway rest areas. In the United States, the Department of Housing and Urban Development (HUD) has placed kiosks in many cities across the country to provide information, ranging from how to buy a house to where to find the nearest homeless shelter.[1] In Ontario, Canada, the award winning kiosk project, ServiceOntario by the Ministry of Transportation, allows citizens to renew license plate stickers, search driver, vehicle and carrier records, update address information, pay court fines using VISA or Mastercard, and view and order graphical license plates in convenient locations.[2]

A number of developing countries have also begun to deploy the technologies. In India, for example, information kiosks are placed in rural villages, providing poorly educated villagers—who have reaped few benefits from the country's booming trade in information technologies—with direct access to government officials and records as well as to online services such as banking and medical consultations (Lancaster, 2003).

Some predict that in the future, public kiosk systems will be as common as automated teller machines are today (Maxwell, 2001). The technologies will also be used to provide an even wider range of informational and transaction services. For example, digital kiosks can be used to address the future needs of homeland security. As the kiosk technologies continue to evolve and become more integrated with smart card systems or identification systems, digital kiosks may perform a broad range of security functions, including applications for, or renewal of, essential government documents, such as traveling documents or drivers' licenses. In addition, patrols at airports and at border checkpoints can use digital kiosks to verify the personal identity of legal residents more cost-effectively.

Future kiosk development may also lead to new potential of e-governance. At present, most governments only use kiosks for service provision. However, as the identification functions become more secure and standardized, and as more citizens become comfortable with using computer technologies to interact with their government, information kiosks can be placed in public places so that citizens can use them not only to file complaints or request for services, but also to participate in public policy forums, do electronic voting, and provide other forms of direct input into the policymaking process.

## CONCLUSION

Citizen-friendly and convenient access to public information and services is an important goal for effective governance. This is why many governments today have deployed digital kiosk systems as a platform for service delivery. As the technologies continue to advance and

become more widespread, more citizens may rely on them to interact with the government and get what they need 24 hours a day, seven days a week.

Since the widespread adoption of kiosk technologies in the public sector is still a recent phenomenon, more future research about their use is still needed. For example, how the technologies have impacted the labor-government relationship, whether it has impacted citizens' perception of the effectiveness and customer-orientation of the government, and how the technologies can be used more effectively to advance citizen participation and electronic voting, are some of the questions that future researchers may investigate further.

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## KEY TERMS

**Braille:** A system, named after its inventor, of representing letters by raised dots that blind people can read by touch.

**Data Mining:** The process of using analytical techniques to search for meaningful correlations, patterns, trends in a large group of data.

**Digital Divide:** The gap between the information-haves and have-nots, suggested by Lloyd Morrisett. It is marked not only by physical access to computers and connectivity, but also by access to the additional resources that allow people to use technology well.

**E-Government:** A short-form of "electronic government," which refers to governmental effort to enhance access to, and the delivery of, services and public infor-

mation for citizens, business partners, employees, and other governmental entities through information technologies, particularly Web-based Internet applications.

**Information Dissemination Kiosk:** A kiosk system used to display information or to advertise product by providing information about it.

**Interactive Information Kiosk:** A kiosk system used to automate information access or to collect information through interactive communication between users and the provider.

**Kiosk Network: A** series of digital kiosks and other computing devices interconnected by communication paths.

**Proximity Detector:** An electronic sensor which detects the presence of an object within a user-selectable range of the device.

**Touch Screen:** An intuitive computer input device that is operated by touching the virtual push button on the display screen.

**Transaction Kiosk:** A kiosk system used to sell goods and services or to exchange information.

## ENDNOTES

1 More information about the project can be accessed at the department's Web site: http://www.hud.gov

2 More information about ServiceOntario can be accessed at the Ontario government Web site: http://www.mto.gov.on.ca/english/kiosk/index.html

# Digital International Governance

D

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## INTRODUCTION

Up to 1980, *development*, which had been defined as nationally managed economic growth, was redefined as "successful participation in the world market" (World Bank, 1980, quoted in McMichael, 2004, p.116). On an economic scale, specialization in the world economy as opposed to replication of economic activities within a national framework emerged as a criterion of "development." On a political level, redesigning the state on competence and quality of performance in the discharge of functions was upheld, while on an ideological plane, a neo-liberal and *globalization project* was to the fore.

The quite evident failure of development policies in peripheral countries, on the one hand, has contributed to the debate on the need for reform of governing institutions in the world (de Senarcless, 2004); and, on the other, has pushed them, de-legitimized as they are, in the direction of finding new strategies and solutions. In the 1990s, considering their leading role in government reform, international organizations such as the United Nations Organization (UN), the World Bank, the Organization for Economic Co-operation and Development (OECD) and the World Trade Organization (WTO) classified e-government as a core issue on their agenda.

Innovation through information and communication technologies (ICTs) (social and economic advancement among the peoples of the world has become increasingly tied to technology creation, dissemination and utilization) is at the core of the renewed focus on the role of the state and the institutions in this process. Redefining the state—functions, responsibility, powers—as regards world-market priorities and logics, has become a strategic ground for international organization intervention, and ICTs are a strategic tool to achieve these aims.

## BRINGING THE STATE BACK IN

While during the 1980s, the government reform movement had concentrated on deregulation, in the 1990s, it focused more on the reform of core state functions and the building of state capacity. Even though that during this decade for first-world countries, efficiency and the extensive introduction of information technology (IT) for government were fundamental, and the efforts of developing countries were more on building state capacity, decentralization and fighting corruption, differences were not absolute. Converging reform strategies have been widespread.

In the developing world, the impetus for reform of the state came, more often than not, from the development institutions on which those countries relied. Thus, the reform movement involved the re-creation of the state along lines that would help, not hinder, the newly created market economies. Starting in the 1990s, the institutions for development turned their attention and their funding to governance issues. The World Bank, the International Monetary Fund and the OECD all developed extensive programs offering financial resources to countries interested in developing state capacity.

Rethinking the state's role in development is a prerequisite for the *structural adjustment programs (SAPs*). This is a shift in bank-lending policies from providing assistance for developmental concerns to aid for comprehensive policy reform. The World Bank's premise for the shift was that post-colonial development states were overly bureaucratic and inefficient on the one hand, and unresponsive to citizens on the other. This strategy is a way of rebuilding states, through institution building. In this phase of bank involvement, the states are committed to the redefinition of the government's economic priorities. The state sheds its accountability to its citizens, who lose input from their own government.

The UN—recognizing that the state has a key role in the development process and in making globalization work for all in alleviating poverty and income inequality, advancing human rights and democracy—commissioned a report from the Department of Economic and Social Affairs. The *World Public Sector Report* reviews major trends and issues concerning public administration and governance and is published regularly every 2 years.

Moreover, the UN, under the auspices of its Development Programs section, established a program in Public Administration and Civil Service Management Reform. In recent years, it has coordinated external assistance in promoting a professional civil service, transparency, the use of ICTs and other areas of government reform in more than 90 United Nations Development Program (UNDP) countries.

Their funding policy did not seek to recreate the bureaucracies of the 20th century. Rather, their recommendations were couched in the language of new public

management and in favor of reinventing government movements that were popular in first-world countries. For instance, the World Bank declared in its 1997 *World Development Report*:

*[State capacity] means subjecting state institutions to greater competition to increase their efficiency. It means increasing the performance of state institutions, improving pay and incentives. And it means making the state more responsive to people's needs, bringing government closer to the people through broader participation and decentralization.* (Kamark, 2004, pp.18-19)

One implication of this strategy is an expanding trusteeship role for the multilateral agencies that subordinates national policy to the demands of the global economy. Development is namely about policy reform in which ICTs become one of the main implementing tools for organizational and institutional consolidation (Heeks, 2002). This was the prevalent approach throughout the 1980s and '90s. It reflected the spirit of the time and was summed up in the formula *Washington Consensus* (Williamson, 1993); that is, universal convergence on specific principles seen as a shift from bureaucratic centralization to market logics on the one hand, and the establishing of a new way of framing development issues and policies for development on the other.

The UNDP and the UN Conference/Council for Trade and Development (UNCTAD), however, denounced the ever-wider gap between different countries. The responsibility for shifting the approach and the agenda of the international organizations, however, did not lie with these dissenting "voices," but rather with the total or partial failure of e-government for development projects. These failures come at a high price for the world's poorer countries; that is, those very countries which, according to the prevailing paradigm, should have gained most advantage from e-government policies (Heeks, 2003).

## DIGITAL GOVERNMENT OPPORTUNITIES: MANY VOICES AND ONLY ONE REFORM AGENDA?

In the light of the data on the evident inefficiency of development schemes and programs in action, towards the end of the 1990s, a broad-spectrum rethinking policy on strategies to adopt on the part of the international organizations was implemented. Inevitably, e-government policies were affected, too. In a recent study, the UN declared (2004):

*At present, the disparities in access to ICT-related development for the future are remarkable and are likely to become greater, at the current rate of technological advancement. The challenge for development today is to find ways and means to surmount the inequality in development benefits from new technologies. The new paradigm of development requires a re-visitation of the way countries think about ICT and e-government. It needs innovative approaches to government and the public sector; business and the citizen; and culture and society. In other words, a holistic approach is required which fully exploits the centrality of ICT for the vision of a future knowledge society.* (p. i)

The UN *Global E-Government Readiness Report 2004* emphasizes this necessity to elaborate new strategies.

*The new imperative of development is to employ ICT applications across the board for creation of economic opportunities and human development. It is not a matter of choosing between traditional programs to further health, education or ICT, but choosing* the most effective way *for ICTs to help in the delivery of development goals. If disparities are to be removed in the collective global march towards a knowledge society, free access to information and knowledge must become a way of life for all* (p. ix)

Even the World Bank (1997) and OECD (2001, 2003a, 2003b) have adapted their strategies in the direction of a *state-friendly* approach. In the report *Information and Communication Technologies: A World Bank Group Strategy* (2002a), the necessity is underlined for "a shift in the approach to the sector" given that realizing the new vision involves broadening the Bank's established agenda (p. ix). The new strategic agenda envisages the broadening of the World Bank's action range to cover the entire information infrastructure sector. The G-8 Okinawa charter on the global information society concluded that the World Bank Group has an important role to play in this area: as a catalyst in improving access to ICTs and promoting their use for stimulating economic growth, increasing equality and reducing poverty.

The challenge has been to show that growth, liberalization and globalization are still good for the poorer countries, but in a multi-dimensional understanding of both causes and consequences of poverty in which the bureaucratic machine plays a crucial role.

Most recent developments are moving in the direction of convergence between international organization strategies, as emerges from the joint proposals and schemes for identifying medium-term goals for global development, tools for achieving it and for progressively assessing outcomes. All of them, not least that of the *Development Contract* (Emmerij, 2004), have as their reference point the proclamation of the *Millennium Development Goals* at the

Millennium Summit, organized in 2000 by the UN, and in the presentation of the project *A Better World for All*, promoted jointly by the UN, OCED, IMF and the World Bank.

An important milestone was the *International Conference on e-Government for Development* organized by the government of Italy in Palermo on April 10-11, 2002. The event, part of the Italian Initiative on E-Government for Development, was a multi-million effort that combines advocacy with funding development projects. The conference provided a platform for members of the G8 Digital Opportunity Task Force (DOT Force) and the United Nations Information and Communication Technology Task Force (UN ICT Task Force).

Convergence was reached in the definition of the framework. The conference recognized that:

- E-government initiatives should be measured by the degree to which they contribute to good governance, empowering people, raising human capabilities and increasing people's access to life choices and opportunities.
- E-government initiatives and projects must be put in the context of broad government reform and a transformation process that aims at increased efficiency, effectiveness, transparency and accountability of government operation.
- E-government initiatives must be put in the context of a broad enabling environment, in which leadership, education and connectivity constitute the core ingredients.
- E-government initiatives based on international cooperation must be open to all in their design and implementation, built on existing local strengths and capacities and respectful of local culture and traditions.

At the Fifth Global Forum on Re-Inventing Government (Mexico City, November 3-7, 2003), Guido Bertucci, director of the Division for Public Economics and Public Administration at the UN, after briefly illustrating the principal trends of development that affect the public sector and the state worldwide, had this to say on developing countries:

*Experience suggests that one of the main causes of the crises plaguing developing countries and the inability of some of them to integrate in the world economy is state capacity deficit. Globalization is certainly presenting many opportunities, including foreign direct investment, trade, access to information technology. However, only countries that have in place an effective public administration, solid political and economic institutions, adequate social policies and a committed leadership can ensure that all sectors of society benefit from greater integration into a world economy.*

The problem is not whether to go global, but rather how to globalize.

The are no quick fixes or ready-made solutions to complex development problems, and it is necessary to consider that reform "should not be imposed from outside" and that "deep understanding of local conditions is essential in designing development programs" (pp.6-7).

Essential factors for success are:

- Political will
- Time: Reforms need time to take effect
- Flexibility of financial resources
- Stakeholders' support
- Investment in ICT
- Support of all sectors of society.

In this approach, even though revived, there is a tendency to de-contextualize the social dimensions of development, and thus to favor generic arguments about social engineering (Bebbington, Guggenhaim, Olson, & Woolcock, 2004).

## TOWARD *E-DEPENDENCY*?

This two-fold tendency to explain the underlying causes of failure and to understand how risks can be reduced, on the one hand, and to de-contextualize the social dimensions of development, on the other, emerges in the framework of one of the most important contributions based on exchange of best practices and dissemination of knowledge: *The E-Government Handbook for Developing Countries* of *info*Dev (World Bank, 2002b). In the preface we read that "e-government will be a powerful tool to help all types of economies (developed, developing and in transition) to bring benefits of the emerging global information society to the largest possible part of their respective populations … ." The need to provide an operational tool to help e-government practitioners arises from the awareness that "since resources remain scarce in regard to the immense tasks of socio-economic development and poverty alleviation, it is essential that they be used wisely and with a maximum chance of success." To the future of e-government will be vital understanding of the causes of their successes and failures, and adapting that knowledge to the characteristics of one's socio-economic environment. The *Handbook* presents a roadmap for policymakers considering electronic government as a mechanism for reform. "It is now clear around the globe that the utilization of ICTs has the potential of revolutionizing the way people interact with government and each other" (p. 1). E-government is a process that requires planning, sustained dedication of resources and political will. The message is that, up to now, too many resources have been wasted for the

limited knowledge of the main variables at stake in the implementing of e-government policies.

However, the *Handbook* has its weak points. On the one hand, there is acknowledgement that e-government policies have greater probabilities of success on the basis of a greater knowledge of socio-economic contexts of reference. On the other hand, it is these very contexts that are missing in the presentation on *best practices*. The short descriptions in the grids of model experiences and what can be learned from them are not much more than general observations under the guise of a *vademecum* for aspiring reformers.

While the shift in discourse has been significant, there is a gap between the rhetoric and the implementation of the policy framework. The UNDP reports and other data support a reciprocal relationship between technological achievement and human development, but also that "the digital divide, which recognize the yawning gap in accessibility to the Internet among countries, continues to grow, condemning entire regions of the world to even greater poverty" (Hill & Dhanda, 2003, pp.1021-1022). It would seem, then, that these policies often have not only been inefficient, but also that the new course does not take into due consideration the reasons for such failure; on the contrary, attempts to bridge the digital divide may have the effect of locking developing countries into a new form of dependency on the West. As Wade (2002, pp.443-461), once a World Bank economist, said:

*The technologies and 'regimes' (international standards governing ICTs) are designed by developed country entities for developed country conditions. As the developing countries participate in ICTs, they become more vulnerable to the increasing complexity of the hardware and software and to the quasi-monopolistic power of providers of key ICT services ... Much of the ICT-for-development literature talks about plans, intentions and opportunities provided—and blurs the distinction between these and verified actions on the ground. It talks about benefits and not costs. And it explains cases of failure, when noted, in ways that protect the assumption that ICT investment is a top priority.*

Developing countries are in danger of locking themselves into a new form of e-dependency on the West as they introduce software and hardware systems that they have no capacity to maintain for themselves and that become crucial to the very functioning of their corporate and public sector.

Technical and investment assistance to promote access in liberalized markets is accompanied by definitions of criteria of selectivity and evaluation that maximize the project development impact, and at the same time enhance the role of the organizations that are responsible.

## IN SEARCH OF A NEW PARADIGM

Most recent developments do not suggest a radical shift in policy on the part of the international institutions. In the first phase of the World Summit on the Information Society (WSIS), held in Geneva, December 10-12, 2003, the core issues were put into the framework of the prevailing development paradigm: ICTs have the power to advance human development; in other words, human potential can be through ICTs and access to knowledge. "Development is delivery. This delivery process is geared towards the integration of its recipient into a global marketplace. There is no space for a different conceptualization of development as a process of empowerment that intends 'to enable people to participate in the governance of their own lives'" (Hamelink, 2004, p. 284).

E-dependency issues highlight how the developing countries are disadvantaged in their access to the global economy also by the very standards and rules built into international systems. These standards and rules ensure that as developing countries become more integrated into an international ICT system, Western suppliers benefit disproportionately.

While the international institutions have found agreement on strategic objectives, the many dissenting voices underline how the patterns of globalization and liberalization over the past 2 decades have provoked economic stagnation or decline, and state collapse in some regions of the developing world, such as Africa and Latin America (Putzel, 2005).

Such criticism has damped enthusiasm somewhat, but up to the present time, have not succeeded in altering significantly the predominant approach. It is true to say that the key concepts are now possibilities and opportunities, and technological determinism, therefore, seems to have been replaced by a more realistic approach. However, the pursuit of efficiency and choice for the global consumer-citizen remains a characteristic tendency of institutional policies and ideology.

On the other hand, if it is true to say that the balance of e-government policies has up to now been a negative one, the new opportunities offered by technology innovation should not be discarded: *mobile government* (*m-government)* is the new frontier of institutional and political change.

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## KEY TERMS

**Development Contract:** A comprehensive package of national and international policies, long term in nature, and based on a contract – hence, *reciprocal* conditionality – between industrial and developing countries.

**Information for Development Program (*info*Dev):** A multi-donor grant program that supports innovative projects demonstrating the development opportunities offered by ICTs. *info*Dev's mission is to promote the application of these technologies and the sharing of best ICT practices for social and economic development, with a special emphasis on the needs of the poor in developing economies.

**Globalization Project:** An emerging vision of the world and its resources as a globally organized and managed free-trade/free-enterprise economy pursued by largely unaccountable political and economic elite.

**Mobile Government (M-Government):** A subset of e-government. In the case of m-government, those ICTs are limited to mobile and/or wireless technologies, like cellular/mobile phones, laptops and personal digital assistants (PDAs) connected to wireless local area networks (LANs). M-government can help make public information and government services available "anytime, anywhere" to citizens and officials.

**Millennium Development Goals (MDGs):** The MDGs embody the key dimensions of human development – poverty, hunger, education, health – expressed as a set of time-bound targets. They include halving income-poverty and hunger; achieving universal primary education and gender equality; reducing under-five mortality by two-thirds and maternal mortality by three-quarters; reversing the spread of HIV/AIDS; and halving the proportion of people without access to safe water. These targets are to be achieved by 2015, the comparison point being 1990.

**Organization for Economic Cooperation and Development (OECD):** Organization of industrialized countries of Western Europe, North America, Japan, Australasia and Mexico responsible for gathering data and organizing conferences.

**Structural Adjustment Programs (SAPs):** Programs involving comprehensive economic reform as a condition of a loan package from Bretton Woods agencies.

**Technological Transfer:** The transfer of modern technologies to developing regions.

**United Nations Conference on Trade and Development (UNCTAD):** The arm and voice of the third world in matters of international trade, established in 1964.

**United Nations Development Program (UNDP):** Organization of the UN that enters into joints ventures with third-world governments to found training and other development programs.

**Washington Consensus:** A phrase coined by Williamson to refer to 10 policy issues around which the powerful in Washington, DC (the United States government and international financial organizations) could agree.

**World Bank:** Formed in 1944 to channel public funds into large development projects, including infra-structural and energy loans; key debt manager via structural adjustment and governance conditions.

# Digital Knowledge Flow Platforms for Regional Innovation Systems



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## INTRODUCTION

For the first time in history, practically all the information required to navigate the oceans of a globalising knowledge economy are embodied in the Internet. Yet the demand for proximity to sources of economically valuable knowledge has never been greater. The rise of knowledge clusters like Oulu in Finland, Kista in Sweden, Cambridge in UK, and Cambridge, Massachusetts, let alone Silicon Valley, are testimony to the human desire for face-to-face and handshaking business contact. This paradox is widely commented upon by leading economists and business analysts (Chesbrough, 2003; Krugman, 1995; Porter, 1998) who show that the age of the hierarchical, vertically integrated production function embodied in the fabric of the multinational firm has changed significantly. Ushered in to replace it is a system, we have called Globalisation 2 (Cooke, 2005) based on externalised "node and network" forms of interaction. The Internet and other digital means of managing such informational complexity were said to be essential if we would but learn its rubric and adapt practice accordingly. But, rather like "e-learning" and "online learning" as means to do this, much less is heard of their virtues now than hitherto. The reason is that they underplayed and even ignored the important corollary regarding "learning organisations," which is that good knowledge management also requires "developing organisations." By that is meant reconfiguring inherited hierarchies and their associated technologies and incentive systems.

## BACKGROUND: FROM LEARNING ORGANISATIONS TO DIGITAL KNOWLEDGE PLATFORMS

Although "the myopia of learning" has been condemned since at least 1993 (Levinthal & March, 1993), the most penetrating critique of this comes recently from two distinctive sources. The first is Hansen (2002) who showed the failure of organisational learning wrapped up in the language of "knowledge management" to lie in failure to develop the organisation. He showed that under the guise of "knowledge management," large firms had sought to look into the brains of the workforce to transform its implicit or tacit knowledge (Polanyi, 1966) into explicit or codified knowledge and exploit it. These ideas had been floated in Nonaka and Takeuchi's (1995) influential book on the knowledge-creating company. However, Hansen showed that the "knowledge management systems" put in place had produced disappointing results. This was for three reasons. First, the knowledge management system technologies were designed so that knowledge mainly moved upwards to executive level. Second, workers received no feedback or knowledge-sharing opportunities and, crucially, no new incentive structure to reward them for sharing tacit or specific codified knowledge, so they stopped divulging knowledge for obvious reasons. Finally the "silo" structures of large-firm bureaucracy also prevented lateral movement of knowledge and information. Accordingly, only top management in theory benefited from knowledge transfer, but they were first presented with knowledge overload that could not adequately be absorbed organisationally, then they were confronted with a knowledge drought when the workforce stopped engaging.

On the basis of this research, Hansen made a number of recommendations that required organisational change that could enable digital knowledge management systems to function optimally on the basis of what we are referring to in this contribution as Digital Knowledge Flow Platforms (DKFP). The first lesson is that knowledge management systems do not function appropriately unless the organisation is itself transformed. The second step, which moves towards a more appropriate knowledge management environment is to reduce organisational hierarchy and remove "silos." Third, knowledge has to be organised so that it has lateral as well as vertical upwards and downwards vectors, allowing for feedback looping. Fourth, the workforce must be incentivised to share knowledge, not merely through improved job-satisfaction but through pecuniary rewards based on the frequency, quality, and impact of knowledge sharing. Finally, appropriate digital systems software is required so that knowledge sharing is made technically simple through interaction with computers and mobile telephony.

A second illustration of how DKFP requires organisational transformation comes from Aalborg Uni-

versity, Denmark where Dirckinck-Holmfeld (2002) showed how e-learning failed when no change was made to the traditional lecture-based pedagogy of traditional learning. This discovery occurred with the introduction of e-learning, Internet-based activity in Aalborg University itself, where it worked. But when it was transferred to other Danish universities it was a failure. The reason was that Aalborg, like Roskilde University was one of Denmark's two new universities dating from the 1970s. In those radical times, they were organised with an interdisciplinary core curriculum centred upon students engaging in team-based project work rather than lecture-based learning. E-learning in a classroom where a video of a lecturer standing at a lectern with text of the lecture scrolling down the side of the lecturer's image proved actually to be a good cure for insomnia. However, interactive, project-based team learning where problem-solving information of relevance to knowledge development by the student team is instantly accessed by Internet is actually efficient, effective, and exciting. However, most universities still mainly use lectures rather than projects to teach, especially the much enlarged classes of the 2000s, hence e-learning has failed to make great inroads. That is not to say that lecturing itself cannot be refreshed by DKFPs, as cases where the lecturer accesses from a console Internet updates to points that are being made verbally show. But this requires levels of expenditure and expertise, never mind possible time inefficiencies if technological discontinuities occur, that make it something of a luxury in most public sector pedagogic contexts[1].

Thus, some important lessons have been learned about learning and knowledge generation itself during the past decade. For example, many business leaders confronted with the preceding account might emphasise the fact that their businesses have successfully run DKFPs for year if not decades. But these are usually information not knowledge management systems. Hence, as long ago as the early 1990s IBM utilised a third party to manage its supply chain for items costing then less than DM 50 per unit. At that time, in Germany for example, the media giant Bertelsmann was IBM's favoured third-party supply chain manager for small items. IBM's strict internal accounting rules meant that, at that time, more valuable items had to be signed off by the head purchasing manager (Cooke & Morgan, 1998). More recently, it has become common in global supply chain management for all predictable items to be managed even by small, specialist third party supply chain management companies. Hewlett Packard in Scotland, for example, and presumably elsewhere was in 2002 contracting this function to such a company that used proprietary IBM Lotus Domino software to replenish consignment stocks as these ran down (OECD, 2004)[2]. But such systems are scarcely knowledge management, they are scarcely even artificial intelligence—another digital dream that turned sour in the 1990s—but simple automatic shelf stacking systems based on codified information. Clearly, the key lesson learned is how different knowledge is from information.

To dwell on this distinction for a moment, let us consider the nature of the difference. Information theory can be traced back at least to the pioneering research at Bell Laboratories of engineer Claude Shannon (1948, p. 379-380) who defined information as messages possessing *meaning* for sender and recipient. This is a "train timetable" theory since Shannon said that communication's "significant aspect is that the actual message is one *selected from a set* of possible messages..." (1948, p. 379 original emphasis). Thus, you choose from a menu of provided information that has meaning for your next action as a relatively passive recipient. Typical of its time this was a linear, inscriptive, traditional engineering metaphor. This approach then fuelled research professing to have identified "information overload" (Miller, 1978) from the exponential growth in messages, subsequently increasingly diffused by "information and communication technology" (ICT) (Lievrouw & Livingstone, 2002; Seely Brown & Duguid, 2000). This rather conflated information and knowledge. To return to the train timetable, it is clearly full of information, but it is as Shannon said, only useful when meaningful. But meaning is not supplied by the information but by the knowledgeable actor. In this case, the knowledge of where she wishes to travel to is what gives the timetable meaning on which action is based. So the distinction is based on interactions between the supply of (codified) *information*, the application of *meaning* derived from tacit (but codifiable) *knowledge* that triggers subsequent *action.*

## DKFP AND REGIONAL INNOVATION SYSTEMS

Hence, we have a glimpse at the cause of a major problem both for firms and other kinds of organisation, including whole economies or regional parts of them that must change to confront new pressures to innovate, be creative, and implement novel strategies. Digital systems react to information not knowledge, especially not tacit knowledge. Transferring tacit knowledge to the outside world in a meaningful way is not a direct but a mediated process. Thus far much of the knowledge management literature has been insufficiently appreciative of these considerations. The innovation literature typically refers to the necessity for implicit knowledge to be made explicit and codified as documentation, manuals or software, for example, in order that the potential productivity of new

knowledge may be realised (Edquist, 1997). Thereafter such knowledge becomes information that may be configured for digital analysis and application as discussed above. However, organisational knowledge is difficult to translate, especially when the organisation is externalised and takes the complex form of an economy or a regional part of it. Hence, knowledge transfer is a much more uncertain, indeed strictly asymmetrical process (Akerlof, 1970; Cooke, 2005). To improve, become more competitive or innovative a firm, organisation, or person may try to learn from the observable information that may be gained from what is perceived to be a superior performer. It might engage in study visits to benchmark "best practice," another activity that has grown enormously in scale in the past decade or so.

But an organisation or person that becomes accustomed to learning from elsewhere in the form of pre-existing (pre-digested) information, cannot cope with novelty[3]. Desultory regional economies and their learning organisations are condemned to a treadmill of absorbing old information. After trying to learn its lessons it may possibly implement them in time to discover that superior intelligence from elsewhere has already set new standards. Learning and innovation are opposites, and innovation, as we have seen, requires organisational change.

This is largely because it is difficult to transform the tacit nature of successful practice into the codified recipe capable of successful emulation. This affects core thinking about knowledge in many fields. That is because tacit knowledge does not transfer simply into codified, because of "epistemic communities" and "cognitive dissonance." Rather it is mediated, but until now there has not been a word or concept to capture that mediation. The third party must be *complicit* with the knowledge of the implicit knowledge-holder for that knowledge to be made reasonably explicit to her interlocutor. In this way, *meaning* may be given to the member of the "other" epistemic community by a process somewhat comparable to that of "triangulation" in social scientific methodology.[4]

A complex organisational change that numerous regions effected in the 1990s and into the 2000s concerns innovation systems, specifically *regional* innovation systems. Although in the EU over one hundred regions have been exposed to regional innovation *strategies* since 1994 (Oughton, Landabaso, & Morgan, 2002), Carlsson (2006) has tracked over two hundred regional innovation systems *studies* between 1987 and 2002, half of them products of empirical research. These show leading and lagging regions improving innovative performance by re-designing their boundary-crossing mechanisms or "bridging social capital" (Putnam, 1999) between research (*exploration* knowledge) and commercialisation (*exploitation* knowledge; March 1991)[5]. Moreover, in Cooke, Heidenreich, and Braczyk, (2004) the evolution of regional innovation systems worldwide in the face of economic downturn and globalisation effects is delineated. These now transcend simplistic knowledge transfer notions like the "Triple Helix" (Etzkowitz & Leydesdorff, 1997) which presents the institutional clash of "epistemic communities" (Haas, 1992) among government, industry and universities as akin to a Holy Trinity. The disequilibriating impulses of the "knowledge economy" have prompted innovative thinking in lagging regions whereby the Holy Trinity is eschewed and even the "holy of holies" the *university* is looked upon askance in the quest for regional *constructed advantage* (Foray & Freeman, 1993). Solutions arising from these new approaches will be presented in the next paragraph.

The point here is that economic governance agencies, like firms and persons, eventually realise the futility of trying to "clone" successful cases by learning and copying information–even if mediated by a complicit third party[6]—and are forced to the ominous deduction that they must, fundamentally, devise their own solution tailored to their own conditions, informed by lessons from elsewhere, but interacting with the endogenous knowledge-base of their own context. This is what is best termed *recombinant* innovation, contrasted with *incremental* organisational innovation that as Lindblom (1977) showed, may lead conservatively in the wrong direction or even round in circles, and *radical* organisational innovation, which as Simon (1955) showed produces "variable overload" and is thus difficult to manage. Recombinant organisational innovation is massively assisted by development of regional innovation systems adapted to contextual specificities as discussed above. And of immense support to well-functioning regional innovation systems is a successful DKFP that circulates and communicates much codified or explicit, complicit, and potentially some fragmentary implicit knowledge across the "epistemic communities" that compose it. For, in a far more complex way than that imagined in the Triple Helix literature (Etzkowitz & Leydesdorff, 1997) regional innovation systems must integrate complexity in the external environment.

## FUTURE TRENDS: DKFP IN PRACTICE AND EXPERIMENTATION

How might internal and external disconnects be moderated? In respect of Scottish Enterprise the question arose of an enhanced Intranet facility, problematic as it had been designed for confidential business interactions among the Scottish global business diaspora. Time would be needed to populate it with requisite information, and commitment from field officers and HQ staff to

keep it updated. Moreover job descriptions would need to specify as a requirement that it should be an everyday responsibility to find out what of relevance was posted upon it. To give weight to the importance of intra-organisational "knowledge of the world" this knowledge management and processing function should be given status through the appointment, presumably at the centre but with network-wide scope, of a senior knowledge manager. TalentScot was the forerunner, having been similarly digitally created to enable Scotland's advanced software research Alba Centre to recruit talent in ICT businesses and research. This model was adapted to that provided by GlobalScot as an Extranet, albeit focused on Scots and Scotophiles abroad. A polling function to access key international knowledge (including tacit perceptual as well as explicit knowledge) flows while maintaining security is in development.

A different model is under development at VINNOVA in Sweden. There, it is internal "organisational knowledge" concerns that have stimulated the creation of an Intranet that could be transformed into an Extranet to regional innovation systems the agency is constructing throughout Sweden. VINNOVA was in 2001 an organisational innovation arising from a former technology transfer agency called NUTEK. The latter was seen politically as having failed Sweden's regional development and to be over-wedded to an engineering culture influenced still by the linear innovation model, itself reflected in over-allocation of technology subsidies in the Stockholm area. VINNOVA's task is to build innovation systems in Sweden's regions. It has begun with cluster building activities in Skåne, Uppsala and west of Stockholm. However the new economic governance agency contains two cultures and administrative "silos" and different parts of the agency did not necessarily know what other parts were doing. Hence, this author's recommendation that VINNOVA should construct a DKFP along lines advocated in Hansen (2002). By late 2004, such an Intranet system had been constructed and populated using a Geographical Information Systems program format. Thus, the system contains locational data on all innovation nodes and networks in Sweden and its regions, with detailed firm data available in layered map-based geographical information. On to these bases are added policy information, types of measures and financing regimes. This database GIS will be accessible by all VINNOVA employees, and if successfully adapted so that knowledge may be added in structured form by any authorised member of the workforce, will act as a policy-based knowledge management system. In time and subject to data protection standards it could, in principle be made accessible to actors external to VINNOVA. So far both systems discussed are only in the experimentation phase.

## CONCLUSION

This contribution has discussed three main things and shown how lessons learned from inadequate conceptualisation of the nature of knowledge have assisted economic governance agencies to advance digitally in their support services to innovation. It was shown first that business made several early efforts to develop "knowledge management systems" that did not work due to no change being made to the organisation in which knowledge management was introduced. The critique of this showed that breaking down of silo mentalities and stimulating feedback within the organisational structure were essential, as indeed was incentivisation of the workforce. Other digital system management, as with supply chain management outsourcing to third parties constituted information management—a far simpler task than knowledge management because it lacks the tacit dimension.

Second, organisations that increasingly deal with external complexity, across epistemic community boundaries, and including many different kinds of third party *complicit* knowledge intermediaries are exemplified well by those that engage in economic governance, particularly that characterised by supporting the design and realisation of regional innovation systems. Experience of managing complex interactions of this kind where exploration, examination, and exploitation knowledge have to be successfully recombined revealed that past traditions of imitative learning were insufficient to aid implementation of modern innovation support strategies. Third, interactive innovation for knowledge creation endogenised to the specific region is now widely seen as a superior albeit challenging methodology. Early results are promising and practical, with Geographical Information Systems (GIS) technology proving to be a highly effective digital means of facilitating global knowledge flows animated by economic governance agencies involved in facilitating regional innovation systems.

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## KEY TERMS

**Digital:** A system that uses discrete values rather than a continuous spectrum of values.

**Flow:** Movement of physical or non-physical entities through time and space.

**Innovation:** The processes whereby "exploration" or basic research knowledge has been "examined" in various ways for "exploitation" as a new product, service, process, or organisational form with commercial value.

**Knowledge:** Information enabling meaningful action.

**Learning:** Transferred and absorbed knowledge.

**Platform:** Support framework consisting in multiple elements, actors, and processes assisting fulfilment of shared purposes.

**Region:** This derives from Latin "regere" meaning "to govern." Thus a region is a level of governance, normally as part of a country's administration, between the local or municipal and the "nation state."

**System:** Links between nodes that interact for a purpose. In social systems these interactions are relatively "open"; whereas in, for example, engineering systems (e.g., central heating) they are relatively "closed."

## ENDNOTES

1 Space does not allow a fuller review of improvements to knowledge management systems occurring of late. Technologically-speaking, convergence between computer tools, the Internet and communication software networks has evolved, rather as with, in a different context, mobile telephony (see Cooke, 2002). An anonymous referee also suggests the move towards a notion of "intellectual capital" integrating creativity and reverse engineering tools by digital means is the way to go. However, in social science the reductionism implied in an idea such as "intellectual *capital*" is widely criticised for its inattention to context and cognition. While the industrial economics literature shows how its measurement is heavily influenced by stock market "hype" bordering on fraudulence, as in cases such as Enron, WorldCom, and AOL Time Warner (see, for example, Fusano & Miller, 2002; Klein, 2004). Digital governance cannot risk such ethical quagmires, thus GIS is seen as a more "trustworthy" tool, also possessing geographically attuned technical capabilities perhaps more susceptible to jurisdictional needs than those of profit-maximisation.

2 This was related to this author by the owner of the specific business, during an OECD mission to Scotland in November 2002 to examine the economic governance agency *Scottish Enterprise*'s global knowledge flows strategy response to the rise of the knowledge economy. The published report from OECD is available as OECD (2004).

3 It is often the view of proponents wedded to the "apple pie" virtues presumed to be denoted by "learning" that it is an intrinsically "good thing." This is not disagreed with here. However, an uncritical perspective upon learning is. Thus while such proponents may nowadays accept governance weaknesses associated with "learning from samples of one" or "myopic learning" (e.g., the "clusters craze") there is reluctance to recognise that endogenous "learning" may also not be problem-free. The governance problem here is twofold: first, endogenous learning may not be innovative; second, asymmetric knowledge endowments may be exceptionally difficult to overcome. To paraphrase Akerlof (1970), learning policy "lemons" (which it is arguable is not unusual) is as ineffective and inefficient as, at the individual level, buying successive poor-quality second-hand cars (a "lemon" in U.S. slang) which have non-repetitive basic faults about which the salesperson is knowledgeable but the customer is not. The obvious solution is not to buy second-hand, which is an "organisational innovation" admittedly prompted by a kind of Pavlovian stimulus-response "learning."

4 Triangulation is the process whereby in, say, interviewing, the interviewer, and interviewee interact and some hidden or tacit knowledge comes forth. This must normally be checked with a third party for accuracy and veracity. Hence the knowledge is triangulated with someone complicit with the knowledge field.

5 Elsewhere (Cooke, 2005) this couplet has been shown to be as inadequate as that referring to a facile implicit-explicit knowledge transfer process. This is because, as regional innovation systems research regularly shows, exploration knowledge and exploitation knowledge are also mediated, increasingly so, by *examination* knowledge that tests and trials innovations to assess whether they are dangerous to humans and the environment. The exemplar case is, of course, the pharmaceuticals industry where such examination knowledge is now in 2005 having to be made public since large firms have been caught suppressing it as a consequence of which treatments have had lethal effects on patients.

6 Such as, for example a consultant, another activity that mushroomed in the 1990s. Consultants are well-known for having stock knowledge which they profit from by offering suitably adapted on the surface as basically a "one-size fits all" solution. Hence in economic governance, "clusters" consultants make a good living despite absence of evidence that their advice works.

# Digital Morality and Ethics



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## INTRODUCTION

While "digital morality" and "digital ethics" may sound strange, the technologies that drive digital government and democracy operate as well in these less formal areas of social regulation. Information technologies can affect morality and ethics at several levels: facilitating compliance with moral rules, altering the formation of norms and rules, and aiding the ethical assessment of rules. This article sketches an account of ethical decision-making which lets us explore some threats and opportunities of the emerging technologies of digital morality and ethics.

## BACKGROUND

The focus of this article is how new communication technology affects ethical decision-making. Since ethics has a large and controversial literature, we will simplify. First, while disagreement about substantive issues is wide-spread, there is greater agreement about the process of ethical decision-making. Most writers on ethics agree on what counts as ethical agents (i.e., most people, with minor disagreement about young children, some animals, and organizations). Further, there is wide agreement on the kind of decision-making broadly characterized as ethical. We summarize this agreement in terms of ethical decision-making having three components: compliance with moral rules, discovery of moral norms, and critical ethics. Second, while ethics has many dimensions, there is broad agreement in the social sciences that morality and ethics are coordination mechanisms. Agents who can discover the local moral norms and use them to govern their behavior can solve the coordination problems endemic to social life. The ability to critically assess alternative moral rules helps to solve the higher-level coordination problem of moral disagreement.

Although the terms, "morals," and "ethics" are used in a variety of ways, we shall use them to distinguish these two levels, lower and higher, respectively, of coordination and decision-making.

### Rationality and Morality

Moral and ethical agents are a subset of rational agents, whose behavior tracks their values. Rational agents must be able to consider alternative courses of action and their outcomes, rank these outcomes in terms of relevant values, and select the most valued option. Therefore, moral agents inherit the problems of rationality: uncertainty and time constraints, problems of self-control (Rachlin, 2000), framing and other decision biases (Tversky & Kaneman, 1981). On most accounts, moral agents are distinguished from rational agents by a broader set of pro-social or altruistic values and a commitment to following moral rules. These features bring new problems specific to moral decision-making, such as balancing self and others (Schmidtz, 1998) and hypocrisy.

### Social Morality

In addition, moral decision-making has a distinctly social component. Morality depends on moral norms, a subset of social norms that influence individual decisions. Social norms go under the name "conventions" in some literatures; "social equilibria" in others, and refer to existing institutions, rules, traditions, or practices (Binmore, 2004). All involve some coordination: strategic situations where most agents value doing what (most of) the others are doing. In addition, moral norms involve special motivations. Deviant behavior typically invokes both psychological (shame) and social sanctioning (blame).

The social component of moral decision-making can easily go wrong for lack of information, or due to misinformation. In several well-studied cases—college drinking in the US is most thoroughly documented–behavior is in a mistaken equilibrium (Greenberg, Dodd, & David, 1999; Perkins & Berkowitz, 1986). Believing most other students drink heavily, many drink in excess to comply with the norm. Their beliefs are a self-confirming estimation of the group's behavior, which should be amenable to new information.

### Ethics

Ethics aims at critically evaluating morality. Obviously, partisans of two competing norms in a society should not simply appeal to what their own norms require. They need to appeal to "higher" standards: human harm or benefit, rights, progress, national solidarity, tradition, or other ideals. Failures in ethical decision-making combine the problems surveyed for rationality and morality. Ethical

decision-making has an ideal element that links it to other normative ideals, such as deliberative democracy.

## COMPUTER-MEDIATED OPPORTUNITIES AND THREATS

Having resolved the field of ethics (broadly considered) into three components, it becomes clearer how computer-mediated technologies can change, perhaps threaten, and hopefully improve each of them.

### Moral Rationality

Computerization can assist rationality in myriad ways—from calculators through spreadsheets and databases—beyond the scope of this article. We will mention a few examples of aids relevant to the rationality of moral and ethical agents.

Visualization software is a major innovation relevant to normative rationality. These programs allow us to see how our values map onto the world. Examples are maps of political preferences and scorecards ranking firms and mutual funds by "ethical" scorecards. Calculators allow us to evaluate our choices in terms of our values. For example, global warming gas emissions calculators help us decide between our energy intensive options and so achieve personal responsibility, if desired (Danielson, 1993). Simulators allow us to think through values and choices in complex technical and social environments. (Epstein & Axtell, 1996) is the most developed academic example of a simulator designed to increase insight into elementary social science. Of course, computer-mediated communication also can threaten moral rationality. New media can add new distractions and sources of poor quality information, especially until our information filters catch up with the technology. Simulators may imbed biases in ways that are difficult to counter. Violent electronic games that give the thrill of combat, aggressive driving, and street crime shorn of all consequences are prominent examples of morally dubious simulators (McCormick, 2001). Some criticize even the more pro-social SimCity series for the weight of entertainment as contrasted with educational values (Starr, 1994).

Moral decision-making is based on moral rules. Compliance is difficult when the rules are complex, unclear, and various. Research ethics provides a good example of this problem and the promise of digital technology to mitigate it. Human "gene banks" are collections of genetic data (or tissue samples), clinical data, and environmental data. Genomic scientists see great promise in research linking this data across large populations. Unfortunately, the moral rules governing who can access which data vary across jurisdictions and are often unclear (Maschke, 2005). Note that this problem arises in spite of the relatively formal nature of the rules and their institutionalization by ethics review boards. Recent work by bioinformaticians involves applying digital technology to this problem. Wilkinson (2003) suggests that "ethics ontologies" can allow automated "agents" to navigate the rules governing access to various sources of data. This computer-mediated resolution of moral uncertainty yields the direct benefit of allowing researchers to access only the data they morally ought to be permitted to use. Indirectly, it may allow research subjects deciding between granting or withholding consent to a particular use better to understand the consequences of their decisions.

### Moral Norms

As the most social of our three factors, morality is the most subject to change due to the introduction of new computer mediated technologies. We consider three ways.

1. **Knowledge of Norms:** Most obviously, Web technology has made simple polling very easy. For example, a Victoria, Canada, radio news station runs a different public affairs poll every day on its Web site. These polls attract about 275 responses a day. Notice that polls like this are likely to serve as moral convention amplifiers rather than ethical instruments, for several reasons. First, the poll page displays a tally of previous responses, so participants' answers are not independent. Answers are subject to an information cascade effect that reinforces the power of existing norms (Hirshleifer, 1995). Second, participants are self-selected, inviting interested parties to skew the sample. Third, Web surveys collect superficial "top of head" opinions. However, we need not restrict ourselves to simple polls. More sophisticated computerized surveys allow us to support more complex moral decision-making (Danielson, Ahmad, Bornik, Dowlatabadi, & Levy, in press).
   Since moral norms, as social equilibria, are a function of agents' knowledge and expectations, new information can change norms. Recall the example of campus drinking. Were students to realize that most others are not drinking excessively, they may drink less. In this case, more information weakens the force of the norm that supported drinking.
2. **Changing Social Networks:** Computer-mediated communication can change the social basis of norms by facilitating non-spatial social networks. Consider the example of ""apotemnophilia"—an attraction to the idea of being an amputee" leading to

healthy people seeking amputations, publicized by bioethicist Carl Elliott. It is a good example for several reasons. First, the desire is baffling, "Why would anyone want an arm or a leg cut off? Where does this sort of desire come from?" A surgeon who has performed such operations "has said that the request initially struck him as "absolutely, utterly weird" (Elliott, 2003, p. 209). Second, it is a disturbing example, which helps to overcome the prejudice that something as recent and superficial as computer-mediated communication cannot make a real moral difference. Third, the reader is unlikely to have come across this new community, which helps make the point about coordinating out of the public eye. Fourth, apotemnophilia has been made acceptable due to computer-mediated communication. "By all accounts, the Internet has been revolutionary for wannabes. It took me months to track down even a handful of scientific articles on the desire for amputation. It took about ten seconds to find dozens of Web sites devoted to the topic. Every one of the wannabes and devotees I have talked with about the Internet says that it has changed everything for them…Because the desire is so rare, it is unlikely that most wannabes would ever spontaneously meet another wannabe. But the Internet brings [them] together, online if not in person" (Elliott, 2003, p. 217, 219). Another example of the Internet bringing together groups that validate otherwise morally impermissible behavior are Japanese "suicide clubs" (Harding, 2004).

3. **Anonymity:** While communicating anonymously or using a pseudonym in political debate has a long history, computer-mediated communication has greatly increased its importance (Danielson, 1996). Elliott brings this out as he elaborates on his case study, "Many wannabes participate in on-line groups anonymously. So they get both the comfort and satisfaction of being part of a group, and knowing they are not alone in the world, while also avoiding the potential shame of actually having to reveal themselves to anyone else face-to-face" (Elliott, 2003, p. 219).

## Ethics

At the ethical level, we act as legislators, taking various feasible moralities as the laws amongst which we choose (Rawls, 1955). Computer-mediated communication can add this activity in several ways already covered above. We can collect more information about our own moral norms and other groups" norms, which may be feasible alternatives for us. In addition, we can calculate and simulate how these proposed norms might work for us, and even how our own values might change if make some choices.

Turning to distinctly ethical factors, computer-meditation offers new ways to implement the ideals of deliberative democracy. However, the question whether and if so, when, computer-mediation improves deliberation remains open. Scott (1999) summarizes the recent research on face-to-face versus computer-mediated deliberation as "mixed and inconclusive findings." In a welcome development, the leading theorist of deliberative democracy, James Fishkin is actively experimenting with computer mediated variations of traditional face-to-face meetings (Fishkin, 2004). His group identifies the main drawback of online deliberation: "The major liability of the online model concerns the representativeness of the participant pool. Access to technology remains closely dependent on socio-economic standing, and there is no reason to suppose that the "digital divide" will disappear in the ordinary course of events. The digital divide might, therefore, compromise the ability of online researchers to draw representative samples in the absence of special interventions. But interventions—in the form of free access to technology—are possible" (Iyengar, Luskin, & Fishkin, 2004, p. 4).

Straightforward benefits of online deliberation are low cost and flexible access. A third feature is more complex: "the online process offers greatly improved metrics for determining exactly what the participants are doing, what aspects of the experimental treatment they are making use of, which parts of the briefing documents or the answers to questions they are reading. Hence online Deliberative Polling opens up new possibilities for understanding the mediators of the treatment effects (what exactly is causing the opinion changes), and whether there are inequalities in participation in specific aspects of the process" (Iyengar et al., 2004, p. 4). Here the benefit accrues to the researchers; the deliberation is treated as an experiment. While it is important at this early stage to learn more about alternative deliberative processes, there is a tension between experimentation and ethics here, unless we make the deliberators themselves aware of the new information gained on their process. This is not an objection to the experiment but a pointer to the richness of problems that lie ahead. While the natural information constraints of face-to-face deliberation limit this process, we do not yet know how to use the rich resources of computer-mediated communication in a fully open and reflexive way.

Another feature of deliberation is "the phenomenon of *group polarization*. The idea is that after deliberating with one another, people are likely to move toward a more extreme point in the direction to which they were previously inclined, as indicated by the median of their predeliberation judgments. With respect to the Internet,

the implication is that groups of people, especially if they are like-minded, will end up thinking the same thing that they thought before—but in more extreme form" (Sunstein, 2001). The concern here is that the internet facilitates association with the like-minded (Sunstein, 2000).

## FUTURE TRENDS

Digital morality and ethics are new ways of social regulation, charged with controlling power. Therefore, they are subject to the same forces as more familiar political mechanisms. A report on a participatory experiment in local government observes, "… teledemocracy initiatives potentially perturb the power balance. This effect is likely to be most evident in groups where information is held by a few. Frequently, barriers to communication are clearly more social and political than technological. Also, reluctance to adopt might be ascribed to differences in status (a source of influence) among organization members and, in addition, reflect the values of different political parties and structures" (Watson, Akselsen, Evjemo, & Aarsaether, 1999, p. 61).

Second, we should expect these new communication media to be subject to the pressures found in our traditional fora and venues: the press, media, libraries etc. Ithiel Poole opens his groundbreaking book, *Technologies of Freedom*, with this dramatic warning about "the right of people to speak and print freely, unlicensed, uncensored, and uncontrolled. But new technologies of electronic communication may now relegate old and freed media such as pamphlets, platforms, and periodicals to a corner of the public forum. Electronic modes of communication that enjoy lesser rights are moving to center stage. The new communication technologies have not inherited all the legal immunities that were won for the old" (Pool, 1983, p. 1). Generalizing, traditional modes carry norms—not only legal protections but also communities and professionals such as journalists and librarians—and communal memories. New technologies will not automatically pick up these norms, nor maintain continuity with these communities. A search engine like Google may not distinguish content and advertising in the same way as a newspaper, or indeed, at all. Nor, evidently, do even electronic voting machines, as subject to scrutiny as they are, meet the same standards as more traditional voting practices (Larsen, 1999). Therefore, we need to be cautious about what we may lose in our enthusiasm to embrace new technologies of collective self-governance.

Most generally, we should expect unanticipated consequences: digital morality and ethics are new developments. In particular, technological innovations have fostered optimism. Langdon Winner's essay "Mythinformation" reminds us that other technologies such as television were welcomed—indeed hyped—with great social and political expectations (Winner, 1986). Moreover, most digital morality and ethics innovations are small research projects. They may be utopian; their small scale cannot explore the range of unintended consequences that would likely follow general introduction. Until digital morality and ethics are played out by real social and political agents their full set of consequences, many unanticipated, are practically impossible to discover and assess. They remain beyond our rational or ethical planning horizon.

## CONCLUSION

While digital morality and ethics are new topics, they point to real and important developments. Digital technology has the capacity to change our moral and ethical decision-making at several levels, from implementing existing moral rules to forming new social norms and ethically evaluating our norms.

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## KEY TERMS

**Anonymous Communication:** Occurs when the author cannot be identified.

**Apotemnophilia:** An attraction to the idea of being an amputee.

**Compliance:** The ability to guide one's behavior by social rules.

**Deliberative Judgments:** Contrasted with the more superficial data gathered by public opinion polls.

**Ethics:** Procedures for evaluating moral norms.

**Morality:** The social norms the support the current social equilibria via coordination, psychological and social sanctions.

**Pseudonymous Communications:** Allows the user to retain a continuing name, or "handle" without revealing their identity. Many bulletin board and multi-player games support pseudonymous interaction.

**Social Coordination:** Strategic situations where each agent values doing what (most of) the others are doing.

**Top of Head Judgments:** Superficial opinions associated with public opinion polls.

# Digital Multimedia

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## INTRODUCTION

Multimedia data can be important assets of government computer systems. Multimedia data can be documents, statistics, photographs and graphics, presentations, video and audio of events, and software. Examples include maps, video of meetings, slide presentations by consultants and vendors, graphs of budgets, and text of regulations. Video of meetings of legislatures and other government organizations is particularly valuable as it makes government processes more visible to citizens and can encourage trust in government. Multimedia is also particularly valuable in presenting geographical information (Greene, 2001), a concern of all governments. Added multimedia can also be used to more effectively deliver information to people, as with films, animations, sound effects, and motivational materials.

Multimedia information is important for digital government because it is often a more natural communication mode for people than text. It is thus important that government be responsive to the needs and desires of citizens by providing it. Much of the world is illiterate, and the ubiquity of television means even the literate often prefer watching video to reading text. Some citizens have special needs: Blind people need audio, and deaf people need images. Video and audio also convey information beyond text: A video of a legislature meeting contains subtleties not apparent from its transcript. Research has shown that multimedia is especially good at conveying explanatory information about functional relationships in organizations (Lim & Benbasat, 2002). Research has also shown that people learn better from multimedia presentations than from conventional classroom instruction, and the multimedia provides a consistent experience available at any time unlike human instructors (Wright, 1993).

## BACKGROUND

The management of multimedia data entails considerations not encountered with data that is solely text (Vaughan, 2003). The main problem is data volume: A typical report can be stored in 20,000 bytes, but a typical 20-centimeter square image requires 500,000 bytes to represent adequately, an audio clip that is 1 minute long requires around 1,000,000 bytes, and a typical 3-centimeter square video clip that is 1 minute long requires around 50,000,000 bytes. Compression techniques can reduce storage requirements somewhat; however, media that can be compressed significantly tend to be merely decorative and not very useful for digital government. Multimedia size is especially a problem when transferring media between computers, especially with the limited data rates of conventional telephone lines and modems (Rao, Bojkovic, & Milovanovic, 2002). So, since digital government cannot be sure what technology its citizens have, it must be conservative in its use of multimedia.

Distributed database technology (Grosky, 1997) can help manage multimedia data efficiently. However, the human side of multimedia management requires a different set of skills than those of most computer support staff. One needs media specialists familiar with the problems of the technology, including some staff with art training to address the aesthetic issues that arise. Much multimedia management is time consuming, so adequate personnel must be available. Government can also choose to actively encourage the development of a multimedia-supporting infrastructure by its industries (Mohan, Omar, & Aziz, 2002).

## INDEXING AND RETRIEVAL OF MULTIMEDIA

A first issue in using multimedia data is finding it. Citizens often want to retrieve quite specific multimedia objects to meet their needs, and they can do this with a browser or a search engine (Kherfi, Ziou, & Bernardi, 2004). This requires metadata describing the media objects such as size, date, source, format, and descriptive keywords. A browser can provide a hierarchy of media objects that users can navigate. This works best when media objects can be described in just a few words, or are characterized along a single dimension like date or place. Otherwise, a keyword-based search engine is necessary, such as that provided by commercial services like Google but adapted to search only government data. Accommodating a broad range of citizens means keeping extensive synonym lists for keyword lookup so that many possible ways of specifying the same thing will work. In some cases, a graphical

specification may be a good way for the public to specify what they are looking for, such as a visual timeline or geographical display on which they click on the location they want.

Unfortunately, it is difficult to index and search nontext media for its contents. Segmentation by identifying shapes within images can be tried, but it is time consuming and often unreliable. So captions on media objects (text that describes them) are valuable (Rowe, 2005). They can be directly attached to a media object or located near it in a document. Captions directly attached include the name of the media file, descriptive keywords, annotations describing the object like the *alt* string associated with Web media, the text of clickable links on the Web that retrieve the object, text directly embedded in the media like characters drawn on an image, and data in different channels of the media like narration or closed captions for video. Captions indirectly attached include text centered or in a special font above or below the media, titles and section headings of the document containing the media, special linguistic structures like "The photo shows …," and paragraphs above or below the media. Caption text can be indexed for a more precise keyword search than that obtained by just indexing all the words of the enclosing document (Arms, 1999). This is what the media search engines such as the image searchers of Google and AltaVista do, though their success rate at finding images is not as good as their success rate at text search. Media retrieval is, however, an active area of research, and new developments are appearing frequently.

## DELIVERY OF MULTIMEDIA

Multimedia can enhance documents in many ways. It can enliven information, and this is helpful for the often-unexciting information provided by governments. But the primary concern of government must be for media that convey important information of their own. Mostly, this means the delivery of multimedia information from the government to its citizens, though there are also issues in the collection of information by government (Cheng, Chou, Golubchik, Khuller, & Samet, 2001) and communications within government.

Broadcast technology is the traditional method for a government to disseminate media through newspapers, radio, and television. Broadcast is a one-way technology. This is fine for announcements and authoritarian governments, but interactivity is very important to a responsive and effective government. So, the Internet and especially the World Wide Web are increasingly preferred to deliver user-selected information and permit the completion of forms. The Web is well suited for multimedia. It permits the embedding of pointers to multimedia content in documents with much the same ease as text. Web multimedia can range from informal illustrations to media retrieved from structured databases in response to queries entered on dynamic Web pages. Media is particularly helpful for the illiterate as graphical interfaces can enable access to the full power of computers without the necessity of words.

A key issue for digital government is the choice of media formats. Government information systems intended for only internal use can follow very few mandated formats for interoperability. But much multimedia is for the public, and the public uses a diversity of computers, software, and networking services, and accessibility to all citizens is important. So copies of important multimedia in different formats are essential. Web images are currently mostly in JPEG and GIF formats, with some in PNG format. Audio and video are more diverse: Currently popular audio formats are WAV, RAM, MID, and ASX, and currently popular video formats are MPEG, SWF, MOV, FLI, AVI, and MP3. Multimedia can also be software in various formats. Not all these formats are supported by all Web browsers, so it is important for government to provide free viewer software for downloading so citizens can view any of its multimedia. This generally restricts governments to using formats that have free open-source software for reading or viewing them.

Multimedia software of particular interest to government organizations is groupware, supporting collaborative activities of groups. It can be used to run meetings of people at widely scattered locations so participants can see, hear, and read comments by other participants. Groupware requires transmission of video, audio, and graphics between sites (Klockner, Mambrey, Printz, & Schlenkamp, 1997).

## STREAMING MULTIMEDIA

Because of its bulkiness, multimedia is often best stored at a few centralized sites and retrieved from there. That can entail logistical problems since video and audio in particular need to be delivered at a certain minimum speed to be viewable or listenable (Smith, Mohan, & Li, 1999). Video or audio can be fully downloaded in advance of playing, but this entails a time delay and most citizens prefer real-time delivery (streaming). Important applications with streaming are being accomplished including video meetings, video medicine, distance learning, multimedia mail, and interactive television. Streaming is simplified if it is delivered by one-way broadcast, and this works well for standardized content such as training materials. Traditional technology like television can also be effective in

the streaming of government media (Morisse, Cortes, & Luling, 1999) but requires citizens to access it at a particular time. Another alternative is to supply citizens with an optical disk (CD-ROM or DVD) containing the media.

The biggest challenge with streaming is ensuring adequate bandwidth (rate of data transmission). A single MPEG-1 compressed video of standard television-picture quality needs around 2 megabits per second (though videoconferencing and speeches can be adequate with less), and music audio requires 1 megabit per second. Standard (ISDN) telephone lines provide 0.064 megabits per second, inadequate for both. T-1, T-2, and other lines can improve this to theoretically 1.5 megabits per second, but that is still inadequate for video. Digital subscriber lines using cable-television technology can provide higher bandwidths using network technologies such as ATM, but even those can be pressed to produce real-time video. Data-compression techniques can reduce bandwidth somewhat; typical maximum compression ratios range from 2:1 for audio to 20:1 for images and 50:1 for video. Other tricks with noncritical video are to periodically skip frames or decrease the size of the images.

Transmission bandwidth is also bounded by the delivery rate of the media from an archive. Live video may be able to bypass storage and go directly onto the network. But in general, multimedia data must be archived in blocks for efficient memory management, though the blocks can be larger than those typical for text. Magnetic tape and optical disks are less flexible in manipulating blocks than magnetic disks, so the latter is preferable for multimedia. But it does take time for a disk head to go between blocks, so successive blocks can be put on different disks so that a block from one disk can be transmitted while the other block is being readied (striping).

Besides bandwidth limits, networks can also have transmission delays (latency), which affects real-time interactive applications like videoconferencing. Delays can be minimized by good network routing (Ali & Ghafoor, 2000; Gao, Zhang, & Towsley, 2003). Using different paths to relay different parts of multimedia data from source to destination can reduce the effect of any one bottleneck. If data loss is especially important to avoid, redundant data can be sent over the multiple paths. But much video playback can tolerate occasional data loss.

Another transmission issue is the evenness of the arrival of multimedia data at a destination site (burstiness or jitter) since unevenness can cause unacceptable starts and stops in audio or video. This can happen when other network traffic suddenly increases or decreases significantly. Usually, video delays cannot exceed 0.1 seconds and music-audio delays 0.0001 seconds, so this is a key quality-of-service issue. Caching of data in storage buffers at the delivery site reduces the problem, but effective multimedia buffers must be big. Transmission by multiple routes will also help.

Multimedia delivery is still more difficult when the destination device is a small handheld one since these are limited in memory, processor speed, and networking capabilities. Although multimedia is better displayed on conventional computer hardware, many users prefer such small devices to access the Internet while engaged in other activities. Then streaming is necessary and must be done with significant bandwidth and screen-size limits. Managing the display of information on handheld devices is called content repurposing and is an active area of research (Alwan et al, 1996; Singh, 2004).

Other important technical issues in streaming include the following (Jadav & Choudhary, 1995).

- System architectures should be chosen for fast input and output; parallel ports are desirable.
- Star and fully connected network topologies are desirable. That may only be feasible with local networks for many applications.
- Switches should be preferred to routers on network connections since the routers have lower bandwidths and higher delays.
- Experimentation with the packet size for multimedia data may improve performance since the best size is hard to predict.
- Caching of frequently used data can help efficiency since some media objects will be much more popular than others.

Thus, without careful design there can be serious problems in multimedia delivery. These problems can be negotiated between senders and receivers, either beforehand or at the time of transmission. Generally speaking, worst-case or deterministic metrics for quality of service are more important than average-case or statistical ones for real-time multimedia since users have limits in unacceptable speed, delay, or jitter.

## ARCHIVING OF MULTIMEDIA

Governments must archive many important records, and this includes multimedia information. The size of media objects necessitates high storage costs and slow access. While the costs of storage media continue to decrease, now more data is being created in the first place.

A problem for archiving is the diversity of storage devices and media formats. New ones arise continually, so archiving requires either archiving the hardware and software that can read the stored media even when the hardware, software, and formats are no longer being used

for new media, or else periodically recopying the data into new devices and formats (Friedlander, 2002). For instance, the Library of Congress of the United States still has audio stored on wire media, a technology long obsolete. Video may be a particular problem in the future as there are several competing formats today as well as an ongoing shift to high-definition images. Unfortunately, digital media is different from old books in that it can be virtually undecipherable without the right hardware and software to read it. So governments must continually invest to support their media archives.

Another problem for digital government is to decide what to archive (Liu & Hseng, 2004). Legal requirements may specify particular archiving, but governments have a responsibility to anticipate future data needs as well. Copyright issues can actually simplify as media ages and enters the public domain. But when money for archiving is limited, conflicting interests within the public may disagree as to what information to keep, and politics may be needed to resolve this.

## FUTURE TRENDS

The increasing speed of computers and networks and the decreasing cost of digital storage will enable increased use of multimedia in computer systems in the future. This will enable governments to store and offer increasing amounts of multimedia data for their citizens. Media like video of public meetings, census maps, and graphics documenting government practices will become routinely available so that all citizens can access them without needing to be physically present at government facilities. The main challenges are indexing all these media so citizens can find them, and delivering them (particularly video) across a network fast enough to be useful. Speed and cost improvements alone will not solve all the technical problems as other issues discussed above must be addressed, too. It will take a number of years to reach levels of adequate government media service even in technologically advanced countries.

## CONCLUSION

Multimedia is a natural way for people to communicate with computers, more natural than text, and should become an increasingly common mode for people to learn about and participate in their governments. Good planning is necessary, however, because the data sizes of multimedia objects can be significantly larger than those of text data. This means that media delivery can be unacceptably slow or uneven with current technology, and this limits what can be offered to citizens. Nonetheless, the technology to support media access is improving, and governments will be able to exploit this.

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## KEY TERMS

**Bandwidth:** Amount of data (measured in bits per second) that can be transmitted across a network.

**Broadcast:** Transmission of some data in one direction only to many recipients.

**Caption:** Text describing a media object.

**Data Compression:** Transforming of data so that they require fewer bits to store.

**Groupware:** Software to support collaborative work between remotely located people.

**Jitter:** Unevenness in the transmission of data, an important problem for streaming video.

**Media Search Engine:** A Web search engine designed to find media (usually images) on the Web.

**Metadata:** Information describing another data object such as its size or caption.

**Multimedia:** Data that include images, audio, video, or software.

**Quality of Service:** The quality of data transmission across a computer network as a composite of several factors.

**Streaming:** Video or audio sent in real time from a source, thereby reducing storage needs.

# The Digitalization of the West European Party Systems



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## INTRODUCTION

American politics has been at the forefront of World Wide Web use. In the early 1990s political parties and candidates started to employ Web sites to spread their message. President Bill Clinton's second-term campaign for the 1996 election was the first time the Internet appeared as a pervasive presence in American Politics, and in which all presidential candidates had Web sites (Rash, 1997). After some time, European parties and politicians followed the lead. In this article, we intend to describe the emergence of Web sites of political parties in West European nations. Reaching out to the Web required allocating limited resources. What advantages did parties hope to reap by creating a Web site, and what disadvantages might they have encountered once the sites were in place? Ideally, a comprehensive analysis would include all political parties in every West European nation. Given the complications regarding collection of data from multiple nations, however, we focused on the parties which were represented in parliament. At the same time, not all nations are currently included in this assessment. The data set consists of information provided by country experts that kindly responded to an expert survey, which included categorizing their national parties by party family (ideologically).[1] To facilitate comparative analysis, we have organized the existing data into four chronological lists (tables) and two figures such as the level of Internet penetration in countries, as well as party family, size, and ideological characteristics:

1. "Complete Chronology" provides the data according to party Web site inauguration for all parties and all nations. The calendar year is divided into three-month quadrants. Is there a correlation between the spread of party Web sites in national party systems and the emergence and development of Internet connections within individual countries?
2. "Party Family Chronology" categorizes site emergence regardless of nationality by ideological divisions ranging from "Nationalist/extreme-right" toward the left ending with "Other" (mainly regional parties). Did ideology influence parties' decisions to initiate Web sites?
3. "National Chronology" arranges Web site emergence by individual nation. Did party size (small, medium, or large) influence the Web site creation decision?
4. "National Initiator Chronology" lists only the first political party in each nation to initiate a Web site.

We also include figures that consolidate the data from the lists to portray potential patterns behind party Web emergence.

Our content analysis of the digitalization of Western European parties is limited only to their decisions and motivations for initiating a Web presence. We do not intend to systematically look at other facets of digital activity such as internal uses of Information Communication Technologies (ICTs) by political parties for data management (archiving or membership lists) or communication (newslists).

## BACKGROUND

### Political Parties and the Web: Advantages and Disadvantages

The Internet, and particularly the Web sites, provides a number of advantages to political parties (Abramson, Arterton, & Orren, 1988; Jordan, 1999; King, 2002; Margolis, & Resnick, 2000; Norris, 2000; Selnow, 1998). First and foremost, the Web sites can rapidly provide seekers large amounts of information that can be updated without much difficulty, such as press releases, brochures, electoral programs, or even complete books. Moreover, this information can be presented through varied multimedia forms such as text, image (photographs, video), or sound (spoken word, music). A second advantage is the speed with which information transmission processes are running on the Internet, and the decentral-

ized way in which information can be retrieved. Visitors to a Web site can download abundant information regardless of their geographical distance from the server on which the site is based; in other words, Web sites have a global reach.

Both the demand and supply sides find the speed of the Internet profitable. Parties can update their sites quickly to inform supporters of latest official positions. The political messages can be directed toward a broad public (broadcasting) or oriented toward certain target groups, such as party members, youth, or female voters (narrowcasting). Another advantage is that parties can highlight positions in a "controlled" fashion, without the intermediary roles of selective and interpretive journalists from newspapers, radio, and television—which leads to a new form of political communication ("unmediated politics")—that is neither filtered by, nor dependent upon, the traditional media. In addition, parties can use their sites to attract new members and/or to mobilize campaign workers or money.

Furthermore, the interactive aspects of the Internet allow parties to tailor the issues that are deemed important to followers. If desired, parties can allow site visitors explicit reaction to certain standpoints, propositions, or elements of the electoral campaign. Through this two-way communication, parties can collect sympathizers' opinions and, in principle, confirm, modify, or fine-tune their views where necessary.

In sum, these Web site properties appear to be ideal for the parties, even more so because the costs of installing and maintaining a site are relatively low, certainly in comparison to the costs of advertising in the traditional media. However, not all that glitters is gold; there are also disadvantages with this new medium such as accessibility and security.

The first drawback of the Internet is the flawed, technological security. In the run-up to the British elections in 1997, for example, the Labour Party site was infiltrated and swamped with anti-Labour political slogans and pornographic images. However, security has improved fairly substantially in recent years, though Web sites are still not immune from hackers.

The second one is the "digital divide," which is still relevant. Access to the Internet is restricted in both quantitative and social terms, and this was especially the case at the start of the World Wide Web in 1993 (and continues today). Those who are active in *cyberspace* are certainly not a true reflection of the electorate; in general they are (still) largely male, young, highly educated, and wealthier than the average. Even now a part of the population will not be reached by the new medium (Table 1).[2] Moreover, it may also be assumed that not all netizens will be interested in politics, which means that these advantages for the parties are relative.

Although Web sites certainly have some disadvantages, the advantages for the political parties seem to be much greater. Because parties generally are rather reluctant to provide information regarding the number of visitors to their Web sites, there are strong indications that the use by voters of party Web sites to obtain political information is growing. In the campaign for the parliamentary elections in the Netherlands in 1998, for instance, party sites attracted at most about 100,000 visitors in the five weeks leading up to the elections (Voerman, 2000; Voerman & Boogers, 2005). In the final three weeks of the 2002 and 2003 election campaign, the sites were visited between 1.5 to 2 million times. About 16% of the electorate visited one or more Web sites during the 2002 election campaign and by January 2003 that increased to 17% (Voerman & Boogers, 2005). This relatively high number of voters actively seeking political information reveals that the party sites are beginning to play a more important role in communications between parties and politicians, on the one hand, and the electorate on the other—at least in Dutch politics.[3]

Given the many attractive elements surrounding political party Web sites, it is surprising that so many parties waited so long before starting Web sites. In this article we deal with possible factors which have influenced the moment at which parties adopted Web sites, such as the level of Internet penetration in countries, as well as party family, size, and ideological characteristics. We also expect that parties generally start sites prior to scheduled elections.

*Table 1. Internet users in member states of the European Union and the United States, 1997-2001 (European Commission, 2001, p. 38)*

| | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| European Union | 5.2 | 9.7 | 14.9 | 26.2 | 30.2 |
| Belgium | 4.9 | 7.8 | 13.7 | 22.7 | 27.3 |
| Denmark | 11.4 | 18.9 | 28.2 | 48.4 | 56.2 |
| Germany | 6.1 | 12.8 | 19.4 | 29.6 | 33.2 |
| Greece | 1.9 | 3.3 | 7.1 | 9.5 | 11.8 |
| Spain | 2.8 | 4.4 | 7.2 | 13.9 | 16.4 |
| France | 1.7 | 6.0 | 9.7 | 16.9 | 16.8 |
| Ireland | 4.1 | 8.1 | 11.9 | 27.5 | 27.9 |
| Italy | 2.3 | 5.2 | 8.7 | 23.3 | 24.3 |
| Luxemburg | 7.2 | 11.8 | 17.5 | 27.5 | 33.9 |
| The Netherlands | 6.4 | 10.2 | 19.0 | 45.9 | 57.7 |
| Austria | 8.1 | 7.4 | 10.5 | 37.0 | 51.3 |
| Portugal | 5.0 | 6.0 | 7.0 | 10.0 | 11.8 |
| Finland | 19.5 | 25.5 | 32.3 | 44.5 | 56.1 |
| Sweden | 22.6 | 33.5 | 41.4 | 56.4 | 62.6 |
| UK | 7.3 | 13.5 | 21.0 | 33.5 | 41.7 |
| United States | 15.0 | 22.3 | 40.5 | 56.1 | 61.1 |

## POLITICAL PARTY PATTERNS: GEOGRAPHICAL PATTERN, FAMILY, AND SIZE

### Geographical Pattern

Regarding the geographical pattern, we anticipated that there would be a correlation between the spread of party Web sites in national party systems and the emergence and development of Internet connections within individual countries (see Table 1). An examination of Table 2 demonstrates, indeed, a tendency for Northern European political parties to create Web sites earlier than Southern European parties, because in the former countries more people were online, thus providing a target "audience." The first national party system in which a party started a Web site was Norway in May 1993, followed by the Netherlands in January 1994, the United Kingdom in October 1994, Finland in November 1994, and Italy in December 1994 (see Table 3). Whereas there does appear to be a digital divide of 1.5 years between the north and the south, one should be cautious regarding the lag's implications. Although southern parties may have surfaced later, the motivational Web presence factors that led to site initiation appear to be the same geographically. We see that South European nations score weaker statistically in per capita access to the Web, but that did not keep parties from scrambling in the mid-1990s to create an online presence (Cunha, Martin, Newell, & Ramiro, 2003).

*Table 2. Complete chronology*

| | |
|---|---|
| May 1993 | Senterpartiet (centre social-democrat, regional policy – Norway) |
| 1994 | ÖVP (christian-democrat – Austria) |
| January 1994 | GreenLeft (ecologist party – Netherlands) |
| October 1994 | Labour (social-democrat – UK) |
| November 1994 | Labour Party (social-democrat – Netherlands) |
| November 1994 | Ruotsalainen Kansanpuolue (green-ecologist – Finland) |
| November 1994 | VIHR (green-ecologist – Finland) |
| December 1994 | Partito Radicale (liberal – Italy) |
| 1994-1995 | Front National (extreme-right – France) |
| 1994-1995 | Liberal Party (liberal – Sweden) |
| 1994-1995 | Union pour la Démocratie Française (moderate-right – France) |
| 1995 | Centre Party (centre-liberal – Sweden) |
| 1995 | LIF (liberal – Austria) |
| 1995 | Parti Communiste Français (communist – France) |
| 1995 | Parti Socialiste (social-democrat – France) |
| 1995 | Partido Nacionalista Vasco (centre-right Basque nationalists – Spain) |
| 1995 | Venstre (light right/liberal – Norway) |
| 1995 | Les Verts (green-ecologist – France) |
| February 1995 | Kansallinen Kokoomus (right-liberal – Finland) |
| February 1995 | Nuorsuomalainen Puolue (right-liberal – Finland) |
| February 1995 | Social Democrat Party (christian-democrat – Portugal) |
| April 1995 | Sosialistisk Venstreparti (left-socialist – Norway) |
| April 1995 | Sinn Fein (nationalist, centre-left, N. Ireland – UK) |
| May 1995 | Agalev (green-ecologist – Belgium) |
| May 1995 | Rød Valgallianse (revolutionist, extreme-left – Norway) |
| June 1995 | Christelijke VolksPartij (christian-democrat – Belgium) |
| June 1995 | Portuguese Socialist Party (social-democrat – Portugal) |
| Mid 1995 | D66 (left-liberal – Netherlands) |
| August 1995 | Høyre (conservative – Norway) |
| August 1995 | Sozialdemokratische Partei Deutschlands (social-democrat – Germany) |
| Autumn 1995 | SPÖ (social-democrat – Austria) |
| September 1995 | Convergéncia Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition – Spain) |
| September 1995 | Liberal Party (right-liberal - Denmark) |
| September 1995 | Suomen Keskusta (right-liberal – Finland) |
| October 1995 | Christlich Demokratische Union (christian-democrat – Germany) |
| October 1995 | Forza Italia (right-liberal – Italy) |
| October 1995 | GRALT/GRÜNE (left-liberal – Austria) |
| October 1995 | Conservative (centre-right, conservative – UK) |
| November 1995 | Ulster Unionist Party (centre-right, N. Ireland – UK) |
| December 1995 | Freie Demokratische Partei (liberal – Germany) |
| 1996 | Alleanza Democratica (left-liberal – Italy) |
| 1996 | Conservative People's Party (conservative – Denmark) |
| 1996 | Democratici di Sinistra (social-democrat – Italy) |
| 1996 | Partito della Rifondazione Comunista (communist – Italy) |
| 1996 | Social democratic Party (social-democrat – Denmark) |
| 1996 | Social democratic Party (social-democrat – Sweden) |
| January 1996 | Verdi (green-ecologist – Italy) |
| January 1996 | ECOLO (green-ecologist – Belgium) |
| January 1996 | Vlaams Blok (extreme-right – Belgium) |
| January 1996 | Social Democratic and Labour Party (social-democrat – UK) |
| 1st-3rd quarter 1996 | PASOK (social-democrat – Greece) |
| 1st-3rd quarter 1996 | 38.1 ND-Popular Party (right-liberal) |
| 1st-3rd quarter 1996 | KKE (orthodox communist) |
| February 1996 | Scottish Nationalist Party (nationalist, centre-left – UK) |
| February 1996 | CDA (christian-democrat – Netherlands) |
| February 1996 | Kristelig Folkeparti (christian-democrat – Norway) |

*Table 2. Complete chronology, cont.*

| | |
|---|---|
| Feb/March 1996 | Partito della Rifondazione Comunista (communist – Italy) |
| March 1996 | Eusko Alkartasuna (social-democrat Basque nationalist – Spain) |
| March 1996 | FPÖ (right-liberal – Austria) |
| March 1996 | Izquierda Unida (communist headed coalition – Spain) |
| March 1996 | Moderate Party (conservative – Sweden) |
| March 1996 | Partido Popular (centre-right party – Spain) |
| March 1996 | Partido Socialista Obrero Español (social-democrat – Spain) |
| March 1996 | Portuguese Communist Party (communist – Portugal) |
| April 1996 | Democratic Unionist Party (centre-right, N. Ireland – UK) |
| April 1996 | CD (extreme-right party – Netherlands) |
| April 1996 | Socialistische Partij (social-democrat – Belgium) |
| April-May 1996 | Cristiano Democratici Uniti (christian-democrat – Italy) |
| May 1996 | Green Party (enviromentalist – Sweden) |
| May 1996 | Socialist People's Party (left-socialist – Denmark) |
| May 1996 | Suomen Sosialidemokraattinen Puolue (social-democrat – Finland) |
| May/June 1996 | Lega Nord (autonomist – Italy) |
| June 1996 | Liberals (left-liberal – UK) |
| June 1996 | Arbeiderpartiet (social-democrat – Norway) |
| July 1996 | Centre Democrats (right-liberal – Denmark) |
| July 1996 | Parti Réformateur Libéral (liberal – Belgium) |
| July 1996 | Unió Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition – Spain) |
| Aug/Sept. 1996 | Suomen Maaseudun Puolue (right-liberal – Finland) |
| September 1996 | Vihreä Liitto (social-democrat – Finland) |
| November 1996 | Christliche Soziale Union (christian-democrat – Germany) |
| November 1996 | Die Grünen (ecological – Germany) |
| November 1996 | SP (left-wing socialist – Netherlands) |
| November 1996 | The Unity List (coalition of former smaller communist parties - Denmark) |
| October 1996 | Democratici di Sinistra (social-democrat – Italy) |
| December 1996 | Social liberal Party (left-liberal – Denmark) |
| 1996 | Fremskrittspartiet (extreme-right – Norway) |
| Early 1997 | Bloque Nacionalista Galego (left-wing Galician nationalists – Spain) |
| January 1997 | Esquerra Republicana de Catalunya (left-wing Catalan nationalist – Spain) |
| March 1997 | Parti Social Chrétien (christian-democrat – Belgium) |
| April 1997 | Leftist Party (left-socialist – Sweden) |
| May 1997 | VVD (right-liberal – Netherlands) |
| May 1997 | Christian People's Party (christian-democrat – Denmark) |
| June 1997 | Christian Democratic Party (christian-democrat – Sweden) |
| June 1997 | Danish People's Party (right-wing nationalist – Denmark) |
| June 1997 | Popular Party (conservative – Portugal) |
| June 1997 | Progress Party (right-wing/populist – Denmark) |
| June 1997 | Rinnovamento Italiano-Lista Dini (christian-democrat? – Italy) |
| July 1997 | Centro Cristiano Democratico (christian-democrat – Italy) |
| August 1997 | Vlaamse Liberalen en Democraten (right-liberal – Belgium) |
| Autumn 1997 | Liberaalinen Kansanpuolue (conservative – Finland) |
| October 1997 | Unió Valenciana (centre-right Valencian nationalist-regionalist – Spain) |
| December 1997 | Parti Socialiste (social-democrat – Belgium) |
| 1998 | Mouvements des Citoyens (left-socialist) |
| 1998 | Parti Radical de Gauche (center-left – France) |
| February 1998 | GPV (orthodox christian – Netherlands) |
| March 1998 | RPF (orthodox christian – Netherlands) |
| April 1998 | Coalición Canaria, (centre Canarian nationalists – Spain) |
| April 1998 | Herri Batasuna (left-wing and pro-ETA Basque nationalist – Spain) |
| April 1998 | Partei des Demokratischen Sozialismus (left-wing – Germany) |
| May 1998 | Volksunie (Flemish nationalist – Belgium) |
| October 1998 | Partido Andalucista (centre Andalusian nationalist-regionalist – Spain) |
| October 1998 | Sudtiroler VolksPartei (autonomist – Italy) |
| November 1998 | Chunta Aragonesista (left-wing Aragonese nationalists – Spain) |
| November 1998 | United Kingdom Unionist Party (N. Ireland – UK) |
| December 1998 | Perussuomalaiset (right-liberal – Finland) |
| 1999 | Lutte Ouvrière (extreme-left – France) |
| 1999 | Ligue Communiste Révolutionaire (extreme-left – France) |
| January 1999 | Partito Repubblicano Italiano (liberal – Italy) |
| February 1999 | Front National (extreme right – Belgium) |
| May 1999 | Remonttiryhmä (left liberal – Finland) |
| June 1999 | Bloco de Esquerda (left-socialist – Portugal) |
| November 1999 | SGP (orthodox christian – Netherlands) |
| March 2000 | Partito Popolare Italiano (christian-democrat – Italy) |
| ??? | Alleanza Nazionale (conservative – Italy) |

*Table 3. National initiator chronology*

| | |
|---|---|
| May 1993 | Senterpartiet (centre social-democrat, regional policy – Norway) |
| 1994 | ÖVP (christian-democrat – Austria) |
| 1994-1995 | Front National (extreme-right – France) |
| 1994-1995 | Liberal Party (liberal – Sweden) |
| January 1994 | Green Left (ecologist – Netherlands) |
| November 1994 | Ruotsalainen Kansanpuolue VIHR (green-ecologist – Finland) |
| October 1994 | Labour (social-democrat – UK) |
| December 1994 | Partito Radicale (liberal – Italy) |
| 1995 | Partido Nacionalista Vasco (centre-right Basque nationalists – Spain) |
| February 1995 | Social Democratic Party (christian-democrat – Portugal) |
| May 1995 | Agalev (green-ecologist – Belgium) |
| August 1995 | Sozialdemokratische Partei Deutschlands (social-democrat – Germany) |
| September 1995 | Liberal Party (right-liberal – Denmark) |
| 1st-3rd quarter 1996 | PASOK (social-democrat – Greece) |

*Figure 1. Party family*

Party family: nationalist/extreme right

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | x | | | | | | | | | x | | | x | | | | | | |
| France | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | |

Party family: conservative/right-liberal

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | x | | | x | | | | | x | | | | | | | | | | | | | | |
| Sweden | | | | | x | | | | x | | | | x | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | x | | | x | | | | x | | | | x | | | | x | | | | | | |
| Denmark | | | | | | | | | | | | x | | | | x | | | | x | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | x | | | | xx | | | | | | | | x | | |
| Germany | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | x | | | | x | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | |
| France | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Italy x? | | | | | | | | x | | | | x | | | | | | | | | | | | | x | | | | | |
| Greece | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | |

Party family: christian-democrat

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | x | | | | x | | | | | | | | | | | | | | |
| Austria | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | x | | | | | | | x | | | | | | | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | | x | | | | x | x | | | | | | | | | | | x | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | |

*Figure 1. Party family (cont.)*

Party family: christian-democrat

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | x | | | | x | | | | | | | | | | | | | | |
| Austria | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | x | | | | | x | | | | | | | | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | | x | | | | x | x | | | | | | | | | | x | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | |

Party family: left liberal

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | |
| Denmark | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | |

Perhaps the most important variable is a party's decision to create a Web site looking toward the future rather than the number of netizens existing in a given nation during the early history of the Web. In fact, research by Treschel, Kies, Mendez, and Schmitter (2003) found that public Internet access did not make a difference in the emergence of party Web sites.

## Family Pattern

We assumed that ideology most likely influenced parties' decisions to initiate Web sites. Generally, we expected within the national party systems, parties on the left (social democrat, left-socialist, and communist) to be more open to modernization and, therefore, to the use of new ICT's. We also anticipated that Green/ecological parties would be at the forefront of Web site initiation because of their ideological commitment to participatory forms of democracy and rhetorical emphasis on the importance of ordinary members' and activists' involvement in internal party life. A Web site might, therefore, provide an increased opportunity for Green parties to put into practice grassroots democracy (Ward & Voerman, 2000). On the other hand, we expected parties on the right, Christian-Democrat and especially conservative parties, to lag in Web site formation because of their historical inclinations toward traditionalism. But the data present surprising results.

On the whole, "nationalist/extreme right" parties (Table 4 and Figure 1) presence on the Web began relatively late when compared to other party families. The National Front (France) was the first to initiate a site sometime in 1994/95,[4] much earlier than the remaining parties that appeared from 1996 to 1999 (most by 1998). This is contrary to what might have been expected, namely that these parties were more likely to create a Web presence because they were banned for ideological reasons from traditional media or had to curtail their message. These parties were only successful in parliament from France to the north. One pattern that is clear in terms of site emergence is that most nations have multiple parties (and, therefore, multiple sites) in the "conservative/right-liberal" party family. A substantial number (seven) surfaced sometime in 1994/1995, with the bulk of the 33 parties present by 1998.[5] The Christian-Democrat parties began a Web presence in Austria in 1994, Portugal in February 1995, with most of the remainder on the Web by 1998. There does not appear to be a geographical correlation in this family with emergence scattered over the years.

Left-liberal parties got their start with the Dutch D66 in mid-1995, followed by most of the others by 1997. With the exception of the two Italian parties, most of the seven parties in this family are in northern Europe. There does

*Figure 1. Party family, cont.*

Party family: social-democrat

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | x | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | x | x | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | x | | | | x | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | x | | | | | | x | | | | | | | | | | | | |
| France | | | | | | | | x | | | | | | | | | | | | x | | | | | | | | | | | |
| Portugal | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | x | | | x | | | | | | | | | | | | | | | x | |
| Greece | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

Party family: left-socialist

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | x<br>x | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | x | | x | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | x | | | | xx | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

Party family: communist

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| France | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

Party family: ecologist

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | x | | |
| Finland | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | x | | | | x | | | | | | | | | | | | | | | | | | | |
| France | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

Party family: other

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | x | | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | x<br>x | | x | x | | x | | | | | | | | | x | | | | | | | |
| Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | x | | x | | xx | | x | x | | x<br>x | | x<br>x | | | | | | | |
| Italy | | | | | | | | | | | | | x | | | | | | | | | | | x | | | | | | | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

*Table 4. Party families*

| | |
|---|---|
| **Party family: nationalist/extreme right** | |
| 1994-1995 | Front National (extreme-right – France) |
| January 1996 | Vlaams Blok (extreme-right – Belgium) |
| April 1996 | CD (extreme-right – Netherlands) |
| 1997 | Fremskrittspartiet (extreme-right – Norway) |
| June 1997 | Progress Party (right-wing/populist – Denmark) |
| June 1997 | Danish People's Party (right-wing nationalist – Denmark) |
| May 1998 | Volksunie (Flemish nationalist – Belgium) |
| February 1999 | Front National (extreme-right – Belgium) |
| **Party family: conservative/right-liberal** | |
| December 1994 | Partito Radicale (liberal – Italy) |
| 1994-1995 | Liberal Party (liberal – Sweden) |
| 1994-1995 | Union pour la Démocratie Française (moderate-right – France) |
| 1995 | Centre Party (centre-liberal – Sweden) |
| 1995 | LIF (liberal – Austria) |
| 1995 | Venstre (light right, liberal – Norway) |
| February 1995 | Kansallinen Kokoomus (right-liberal – Finland) |
| August 1995 | Høyre (conservative – Norway)) |
| September 1995 | Liberal Party (right-liberal – Denmark) |
| September 1995 | Suomen Keskusta (right-liberal – Finland) |
| October 1995 | Conservative (centre-right, conservative – UK) |
| October 1995 | Forza Italia (right-liberal – Italy) |
| 1996 | Freie Demokratische Partei (liberal – Germany) |
| 1996 | Conservative People's Party (conservative – Denmark) |
| 1st-3rd quarter 1996 | ND-Popular Party (right-liberal – Greece) |
| March 1996 | FPÖ (right-liberal – Austria) |
| March 1996 | Partido Popular (centre-right – Spain) |
| March 1996 | Moderate Party (conservative – Sweden) |
| July 1996 | Centre Democrats (right-liberal – Denmark) |
| July 1996 | Parti Réformateur Libéral (liberal – Belgium) |
| Aug/Sept. 1996 | Suomen Maaseudun Puolue (right-liberal – Finland) |
| May 1997 | VVD (right-liberal – Netherlands) |
| June 1997 | Popular Party (conservative – Portugal) |
| August 1997 | Vlaamse Liberalen en Democraten (right-liberal – Belgium) |
| Autumn 1997 | SKL (conservative – Finland) |
| February 1998 | GPV (orthodox christian – Netherlands) |
| March 1998 | RPF (orthodox christian – Netherlands) |
| December 1998 | PS (right-liberal – Finland) |
| January 1999 | Partito Repubblicano Italiano (liberal – Italy) |
| November 1999?? | SGP (orthodox christian – Netherlands) |
| ??? | Alleanza Nazionale (conservative – Italy) |
| | Party family: christian-democracy |
| 1994 | ÖVP (christian-democrat – Austria) |
| February 1995 | Social Democratic Party (christian-democrat – Portugal) |
| June 1995 | Christelijke VolksPartij (christian-democrat – Belgium) |
| October 1995 | Christlich Demokratische Union (christian-democrat – Germany) |
| February 1996 | Kristelig Folkeparti (christian democrat – Norway) |
| February 1996 | CDA (christian democratic – Netherlands) |
| April-May 1996 | Cristiano Democratici Uniti (christian democrat – Italy) |
| November 1996 | Christliche Soziale Union (christian-democrat – Germany) |
| March 1997 | Parti Social Chrétien (christian-democrat – Belgium) |
| May 1997 | Christian People's Party (christian-democrat - Denmark) |
| June 1997 | Rinnovamento Italiano-Lista Dini (christian-democrat – Italy) |
| July 1997 | Centro Cristiano Democratico (christian-democrat – Italy) |
| March 2000 | Partito Popolare Italiano (christian democrat – Italy) |
| **Party family: left liberal** | |
| Mid 1995 | D66 (left-liberal – Netherlands) |
| October 1995 | GRALT/GRÜNE (left-liberal – Austria) |
| 1996 | Alleanza Democratica (left-liberal – Italy) |
| June 1996 | Liberals (left-liberal – UK) |
| December 1996 | Social liberal Party (left-liberal – Denmark) |
| May 1999 | REM (left-liberal – Finland) |
| **Party family: social-democracy** | |
| May 1993 | Senterpartiet (centre social-democrat, regional policy – Norway) |
| October 1994 | Labour (social-democrat – UK) |
| November 1994 | Labour Party (social-democrat – Netherlands) |
| 1995 | Parti Socialiste (social-democrat – France) |
| June 1995 | Portuguese Socialist Party (social-democrat – Portugal) |
| August 1995 | Sozialdemokratische Partei Deutschlands (social-democrat – Germany) |
| Autumn 1995 | SPÖ (social-democrat – Austria) |
| 1996 | Social Democratic Party (social-democrat – Denmark) |
| 1996 | Social Democratic Party (social-democrat – Sweden) |
| January 1996 | Social Democratic and Labour Party (social-democrat – UK) |

*Table 4. Party families, cont.*

| | |
|---|---|
| 1st-3rd quarter 1996 | PASOK (social-democrat – Greece) |
| March 1996 | Partido Socialista Obrero Español (social-democrat – Spain) |
| April 1996 | Socialistische Partij (social-democrat – Belgium) |
| May 1996 | Suomen Sosialidemokraattinen Puolue (social-democrat – Finland) |
| June 1996 | Arbeiderpartiet (social-democrat – Norway) |
| September 1996 | Vihreä Liitto (social-democrat – Finland) |
| October 1996 | Democratici di Sinistra (social-democrat – Italy) |
| December 1997 | Parti Socialiste (social-democrat – Belgium) |
| 1998 | Parti Radical de Gauche (centre-left – France) |
| **Party family: left-socialist** | |
| April 1995 | Sosialistisk Venstreparti (left-socialist – Norway) |
| May 1995 | Rød Valgallianse (revolutionary, extreme-left – Norway) |
| 1996 | Synapismos (Eurocommunist – Greece) |
| May 1996 | Socialist People's Party (left-socialist – Denmark) |
| November 1996 | SP (left-wing socialist – Netherlands) |
| April 1997 | Leftist Party (left-socialist – Sweden) |
| End 1997 | Partei des Demokratischen Sozialismus (left-wing – Germany) |
| 1998 | Mouvements des Citoyens (left-socialist) |
| 1999 | Lutte Ouvrière (extreme-left – France) |
| 1999 | Ligue Communiste Révolutionaire (extreme-left – France) |
| June 1999 | Bloco de Esquerda (left-socialist – Portugal) |
| | Party family: communist |
| 1995 | French Communist Party (communist – France) |
| 1st-3rd quarter 1996 | KKE (communist – Greece) |
| 1996 | Partito della Rifondazione Comunista (communist – Italy) |
| March 1996 | Portuguese Communist Party (communist – Portugal) |
| November 1996 | The Unity List (coalition of former smaller communist parties – Denmark) |
| **Party family: ecologist** | |
| January 1994 | Green Left (ecologist – Netherlands) |
| November 1994 | Ruotsalainen Kansanpuolue VIHR (green-ecologist – Finland) |
| 1995 | Les Verts (green-ecologist – France) |
| May 1995 | Agalev (green-ecologist – Belgium) |
| January 1996 | ECOLO (green-ecologist – Belgium) |
| January 1996 | Verdi (green-ecologist – Italy) |
| May 1996 | Green Party (enviromentalist - Sweden) |
| November 1996 | Die Grünen (ecological – Germany) |
| **Party family: other** | |
| 1995 | Partido Nacionalista Vasco (centre-right Basquenationalists – Spain) |
| April 1995 | Plaid Cymru (regionalist – UK) |
| April 1995 | Sinn Fein (nationalist, centre-left, N. Ireland – UK) |
| September 1995 | Convergéncia Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition – Spain) |
| November 1995 | Ulster Unionist Party (centre-right, N. Ireland – UK) |
| February 1996 | Scottish Nationalist Party (nationalist, center left – UK) |
| March 1996 | Eusko Alkartasuna (social-democrat Basque nationalist – Spain) |
| April 1996 | Democratic Unionist Party (centre-right, N. Ireland – UK) |
| May-June 1996 | Lega Nord (autonomist – Italy) |
| July 1996 | Unió Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition – Spain) |
| Early 1997 | Bloque Nacionalista Galego (left-wing Galician nationalists – Spain) |
| Jan. 1997 | Esquerra Republicana de Catalunya (left-wing Catalan nationalist – Spain) |
| Summer 1997 | Iniciativa per Catalunya-Verds (red-green ecosocialists of Catalonia – Spain) |
| October 1997 | Unió Valenciana (centre-right Valencian nationalist-regionalist – Spain) |
| 1998 | Mouvements des Citoyens ? (– France) |
| April 1998 | Coalición Canaria, (centre Canarian nationalists – Spain) |
| April 1998 | Herri Batasuna (left-wing and pro-ETA Basque nationalist – Spain) |
| October 1998 | Sudtiroler VolksPartei (autonomist – Italy) |
| October 1998 | Partido Andalucista (centre Andalusian nationalist-regionalist – Spain) |
| November 1998 | United Kingdom Unionist Party (N. Ireland – UK) |
| November 1998 | Front Démocratique des Francophones (French-speaking federalists – Belgium) |
| November 1998 | Chunta Aragonesista (left-wing Aragonese nationalists – Spain) |

*Table 5. National chronology*

| | | | |
|---|---|---|---|
| **NORWAY** | | | |
| | ’93 | ’97 | (Pecentage of votes in General Elections) |
| May 1993 | 16.7 | 7.9 | Senterpartiet (centre social-democrat, regional policy) |
| **Parliamentary Elections: 12/13 September 1993** | | | |
| 1995 | 3.6 | 4.5 | Venstre (light right, liberal) |
| April 1995 | 7.9 | 6.0 | Sosialistisk Venstreparti (left-socialist) |
| May 1995 | 1.1 | 1.7 | Rød Valgallianse (revolutionist, extreme-left) |
| August 1995 | 17.0 | 14.3 | Høyre (conservative) |
| February 1996 | 7.9 | 13.7 | Kristelig Folkeparti (christian-democrat) |
| June 1996 | 36.9 | 35 | Arbeiderpartiet (social-democrat) |
| 1997 | | 15.3 | Fremskrittspartiet (extreme-right) |
| **Parliamentary Elections: 15 September 1997** | | | |
| | | | |
| **GERMANY** | | | |
| **Parliamentary Elections: 16 October 1994** | | | |
| | | ’94 | (Pecentage of votes in General Elections) |
| August 1995 | | 36.4 | Sozialdemokratische Partei Deutschlands (social-democrat |
| Oktober 1995 | | 34.2 | Christlich Demokratische Union (christian-democrat) |
| 1996 | | 6.9 | Freie Demokratische Partei (liberal) |
| November 1996 | 7.3 | Christliche Soziale Union (christian-democrat) | |
| November 1996 | 7.3 | Die Grünen (ecological) | |
| End 1997 | | 4.4 | Partei des Demokratischen Sozialismus (left-wing) |
| **Parliamentary Elections: 27 September 1998** | | | |
| | | | |
| **PORTUGAL** | | | |
| **Parliamentary Elections: 1 October 1995** | | | |
| | ’95 | ’99 | (Pecentage of votes in Parliamentary Elections) |
| February 1995 | 34.0 | 32.3 | Social Democrat Party (PSD; christian-democrat) |
| June 1995 | 43.8 | 44.0 | Portuguese Socialist Party (PS; social-democrat) |
| **Presidential Elections: 14 January 1996** | | | |
| March 1996 | 8.6* | 9.0* | Portuguese Communist Party (PCP; communist) |
| June 1997 | 9.1 | 8.4 | Popular Party (PP; conservative) |
| July 1997 | --- | 2.5/ | Popular Democratic Union (UDP; left-socialist) |
| 1998 | --- | 2.5/ | Revolutionary Socialists (PSR; left-socialist) |
| June 1999 | --- | 2.5/ | Left Bloc (UDP+PSR+Politica XXI; left-socialist) |
| **Parliamentary Elections: 10 October 1999** | | | |
| March 2000 | 8.6* | 9.0* | Ecologist Party – the Greens (PEV; left-ecologist) |
| / = BE (UDP+PSR+Política XXI) * = CDU (PCP + PEV) | | | |
| **FINLAND** | | | |
| **Parliamentary Elections: 19 March 1995** | | | |
| | ’95 | ’99 | (Pecentage of votes in General Elections) |
| November 1994 | 6.5 | 7.3 | Ruotsalainen Kansanpuolue (green-ecologist) |
| February 1995 | 17.9 | 21.0 | Kansallinen Kokoomus (right-liberal) |
| February 1995 | 2.8 | --- | Nuorsuomalainen Puolue (right-liberal) |
| | | | |
| September 1995 | 19.8 | 22.4 | Suomen Keskusta (right-liberal) |
| May 1996 | 28.3 | 22.9 | Suomen Sosialidemokraattinen Puolue (social-democrat) |
| Aug/Sept. 1996 | 5.1 | 5.1 | Suomen Maaseudun Puolue (right-liberal) |
| September 1996 | 11.2 | 10.9 | Vihreä Liitto (social-democrat) |
| Autumn 1997 | 3.0 | 4.2 | Liberaalinen Kansanpuolue (conservative) |
| December 1998 | 1.3 | 1.0 | Perussuomalaiset (right-liberal) |
| **Parliamentary Elections: 21 March 1999** | | | |
| May 1999 | 1.1 | --- | Remonttiryhmä (left liberal) |
| | | | |
| **AUSTRIA** | | | |
| **Parliamentary Elections: 9 October 1994** | | | |
| | ’94 | ’95 | (Pecentage of votes in General Elections) |
| 1994 | 27.7 | 28.3 | ÖVP (christian-democrat) |
| 1995 | 6.0 | 5.5 | LIF (liberal) |
| Autumn 1995 | 34.9 | 38.1 | SPÖ (social-democrat) |
| October 1995 | 7.3 | 4.8 | GRALT/GRÜNE (left-liberal) |

*Table 5. National chronology, cont.*

| | | | |
|---|---|---|---|
| **Parliamentary Elections: 17 December 1995** | | | |
| March 1996 | 22.5 | 21.9 | FPÖ (right-liberal) |
| **Parliamentary Elections: 3 October 1999** | | | |
| | | | |
| **THE NETHERLANDS** | | | |
| **Parliamentary Elections: 6 September 1989** | | | |
| | | ’94 | (Pecentage of votes in General Elections) |
| January 1994 | | 4.1 | Green Left (ecologist) |
| **Parliamentary Elections: 3 May 1994** | | | |
| November 1994 | 24.0 | Labour Party (social-democrat) | |
| Mid 1995 | | 15.5 | D66 (left liberal) |
| February 1996 | | 22.2 | CDA (christian-democrat) |
| April 1996 | | 2.5 | CD (extreme-right) |
| November 1996 | 1.3 | SP (left-wing socialist) | |
| May 1997 | | 20.0 | VVD (right-liberal) |
| February 1998 | | 1.3 | GPV (orthodox christian) |
| March 1998 | | 1.8 | RPF (orthodox christian) |
| **Parliamentary Elections: 6 May 1998** | | | |
| November 2000 | 1.8 | SGP (orthodox christian) | |
| | | | |
| **DENMARK** | | | |
| **Parliamentary Elections: 21 September 1994** | | | |
| | ’94 | ’98 | (Pecentage of votes in General Elections) |
| September 1995 | 23.3 | 24.0 | Liberal Party (right-liberal) |
| 1996 | 34.6 | 35.9 | Social Democratic Party (social-democrat) |
| 1996 | 15.0 | 8.9 | Conservative People’s Party (conservative) |
| May 1996 | 7.3 | 7.6 | Socialist People’s Party (left-socialist) |
| July 1996 | 2.8 | 4.3 | Centre Democrats (right-liberal) |
| November 1996 | 3.1 | 2.7 | The Unity List (coalition of former communists) |
| December 1996 | 4.6 | 3.9 | Social liberal Party (left-liberal) |
| May 1997 | 1.9 | 2.5 | Christian People’s Party (christian-democrat) |
| June 1997 | 6.4 | 2.4 | Progress Party (right-wing/populist) |
| June 1997 | --- | 7.4 | Danish People’s Party (right-wing nationalist) |
| **Parliamentary Elections: 11 March 1998** | | | |
| **SWEDEN** | | | |
| **Parliamentary Elections: 18 September 1994** | | | |
| | ’94 | ’98 | (Pecentage of votes in General Elections) |
| 1994/5 | 7.2 | 4.7 | Liberal Party (liberal) |
| 1995 | 7.6 | 5.1 | Centre Party (centre-liberal) |
| 1996 | 45.3 | 36.4 | Social democratic Party (social-democrat) |
| March 1996 | 22.4 | 22.9 | Moderate Party (conservative) |
| May 1996 | 5.0 | 4.5 | Green Party (enviromentalist) |
| April 1997 | 6.2 | 12.0 | Leftist Party (left-socialist) |
| June 1997 | 4.1 | 11.8 | Christian Democratic Party (christian-democrat) |
| **Parliamentary Elections: 20 September 1998** | | | |
| | | | |
| **ITALY** | | | |
| **Parliamentary Elections: 27/28 March 1994** | | | |
| | ’94 | ’96 | (Pecentage of votes in General Elections) |
| December 1994 | 3.5 | 1.9 | Partito Radicale (liberal) |
| October 1995 | 21.0 | 20.6 | Forza Italia (right-liberal) |
| **Parliamentary Elections: 21 April 1996** | | | |
| 1996 | 1.2 | --- | Alleanza Democratica (left-liberal) |
| January 1996 | 2.8 | 2.5 | Verdi (green-ecologist) |
| Feb/March 1996 | 6.0 | 8.6 | Partito della Rifondazione Comunista (communist) |
| April-May 1996 | --- | 5.8* | Cristiano Democratici Uniti (christian-democrat) |
| May-June 1996 | 8.4 | 10.1 | Lega Nord (autonomist) |
| October 1996 | 20.4 | 21.1 | Democratici di Sinistra (social-democrat) |
| June 1997 | --- | 4.3 | Rinnovamento Italiano-Lista Dini |
| July 1997 | --- | 5.8* | Centro Cristiano Democratico (christian-democrat) |
| October 1998 | 0.6 | 6.8/ | Sudtiroler VolksPartei (autonomist) |
| January 1999 | --- | 6.8/ | Partito Repubblicano Italiano (liberal) |
| March 2000 | 11.1 | 6.8/ | Partito Popolare Italiano (christian-democrat) |
| ??? | 13.5 | 15.7 | Alleanza Nazionale (conservative) |
| **Parliamentary Elections: 13 May 2001** | | | |

*Table 5. National chronology, cont.*

| | | | |
|---|---|---|---|
| **BELGIUM** | | | |
| **Parliamentary elections: 24 November 1991** | | | |
| | ’95 | | (Pecentage of votes in General Elections) |
| May 1995 | 4.4 | | Agalev (green-ecologist) |
| **Parliamentary elections: 21 May 1995** | | | |
| June 1995 | 17.2 | | Christelijke VolksPartij (christian-democrat) |
| January 1996 | 4.0 | | ECOLO (green-ecologist) |
| January 1996 | 7.8 | | Vlaams Blok (extreme-right) |
| April 1996 | 12.6 | | Socialistische Partij (social-democrat) |
| July 1996 | 10.3 | | Parti Réformateur Libéral (liberal) |
| March 1997 | 7.7 | | Parti Social Chrétien (christian-democrat) |
| August 1997 | 13.1 | | Vlaamse Liberalen en Democraten (right-liberal) |
| December 1997 | 11.9 | | Parti Socialiste (social-democrat) |
| May 1998 | 4.7 | | Volksunie (Flemish nationalist) |
| February 1999 | 2.3 | | Front National (extreme-right) |
| **Parliamentary elections: 13 June 1999** | | | |
| | | | |
| **SPAIN** | | | |
| Parliamentary elections: 6 June 1993 | | | |
| | ’93 | ’96 | (Pecentage of votes in General Elections) |
| 1995 | 1.2 | 1.3 | Partido Nacionalista Vasco (centre-right Basque nationalists |
| September 1995 | 4.9* | 4.6* | Convergéncia Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition) |
| **Parliamentary elections: 3 March 1996** | | | |
| March 1996 | 34.8 | 38.8 | Partido Popular (centre-right) |
| March 1996 | 38.8 | 37.5 | Partido Socialista Obrero Español (social-democrat) |
| March 1996 | 0.5 | 0.5 | Eusko Alkartasuna (social-democrat Basque nationalist) |
| March 1996 | 9.5 | 10.6 | Izquierda Unida (communist headed coalition) |
| July 1996 | | 4.9* | 4.6* Unió Democràtica de Catalunya (CDC; partner in the *Convergència i Unió*; centre-right Catalan nationalist coalition) |
| Early 1997 | 0.5 | 0.9 | Bloque Nacionalista Galego (left-wing Galician nationalists) |
| January 1997 | | 0.8 | 0.7 Esquerra Republicana de Catalunya (left-wing Catalan nationalist) |
| Summer 1997 | | --- | ---* Iniciativa per Catalunya-Verds (red-green ecosocialists of Catalonia) |
| October 1997 | | 0.5 | 0.4 Unió Valenciana (centre-right Valencian nationalist-regionalist) |
| April 1998 | 0.9 | 0.9 | Coalición Canaria, (centre Canarian nationalists) |
| April 1998 | 0.9 | 0.7 | Herri Batasuna (left-wing and pro-ETA Basque nationalist) |
| October 1998 | 0.4 | 0.5 | Partido Andalucista (centre Andalusian nationalist-regionalist) |
| November 1998 | --- | 0.2 | Chunta Aragonesista (left-wing Aragonese nationalists) |
| **Parliamentary elections: 12 March 2000** | | | |
| | | | |
| **FRANCE** | | | |
| **Parliamentary elections: 21/28 March 1993** | | | |
| | ’93 | ’97 | (Pecentage of votes in General Elections) |
| 1994-1995 | 12.4 | 15.1 | Front National (extreme-right) |
| **Presidential elections: 23 April / 7 May 1995** | | | |
| 1995 | 9.2 | 9.6 | Parti Communiste Français (communist) |
| 1995 | 7.3 | 3.6 | Les Verts (green-ecologist) |
| 1995 | 17.6 | 23.7 | Parti Socialiste (social-democrat) |
| 1996 | 19.1 | 14.3 | Union pour la Démocratie Française (moderate-right) |
| **Parliamentary elections: 25 May / 1 June 1997** | | | |
| 1998 | --- | 1.1 | Mouvements des Citoyens (left-socialist) |
| 1998 | 0.9 | 1.5 | Parti Radical de Gauche (socialist; centre-left) |
| 1999 | 1.8* | 2.5* | Lutte Ouvrière (extreme-left) |
| 1999 | 1.8* | 2.5* | Ligue Communiste Révolutionaire (extreme-left) |

*Table 5. National chronology, cont.*

| | | |
|---|---|---|
| **GREECE** | | |
| **Parliamentary elections: 10 October 1993** | | |
| | ’96 | (Pecentage of votes in General Elections) |
| 1st-3rd quarter 1996 | 41.5 | PASOK (social-democrat) |
| 1st-3rd quarter 1996 | 38.1 | ND-Popular Party (right-liberal) |
| 1st-3rd quarter 1996 | 5.6 | KKE (orthodox communist) |
| **Parliamentary elections: 22 September 1996** | | |
| Fall 1996 | 5.1 | Synapismos (Eurocommunist) |
| Fall 1996 | 4.4 | DIKKI (social democrat) |
| **Parliamentary elections: 9 April 2000** | | |
| | | |
| **UNITED KINGDOM** | | |
| **Parliamentary electionss: 1992** | | |
| | ’92 | (Pecentage of votes in General Elections) |
| October 1994 | 34.9 | Labour (social-democrat) |
| April 1995 | 0.5 | Plaid Cymru (regionalist) |
| April 1995 | 0.2 | Sinn Fein (nationalist, centre-left, N. Ireland) |
| November 1995 0.8 | Ulster Unionist Party (centre-right) | |
| October 1995 | 41.9 | Conservative (centre, conservative) |
| January 1996 | 0.5 | Social Democratic and Labour Party (social-democrat) |
| February 1996 | 1.9 | Scottish Nationalist Party (nationalist, centre-left) |
| April 1996 | 0.3 | Democratic Unionist Party (centre-right) |
| June 1996 | 17.8 | Liberals (left-liberal) |

*Figure 2. Party size*

Major Parties (>20% electoral results)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | x x | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | x | | x | | | x | | | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | x | | x | | | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | x | | | | x | | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | | | | x | | | | | x | | | | | | x | | | | | | | | | | | | |
| Germany | | | | | | | | | | x | x | | | | | | | | | | | | | | | | | | | |
| Austria | | | | x | | | | | | x | | x | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | x | x | | | | | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | x x | | | | | | | | | | | | | | | | | | |
| Italy | | | | | | | | | | | x | | | | x | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | xx | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

Minor Parties (3-20% electoral results)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | x | | | | | | x | x | x | | x | | | | x | | | | | | | | | | | | | | | |
| Sweden | | | | | | | x | x | | | | | x | | | | x x | | | | | | | | | | | | | | |
| Finland | | | | | | | x | | | | | | | x x | | | | x | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | x | x | x | x | | x x | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| Netherlands | | | | x | | | | | x | | | | | | | | | | | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | x | | | x x | | | x | | | | | | | | | | | | | |
| Austria | | | | | | | | x | | | x | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | x x | | | xx | x | x | | x | | x | x | | x | | | | | | | | | | |
| France | | | | x | | | | xxx | | | | x | | | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | x | | | | | x | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | x | | x | | | | | | | | | | | | | | | | | | | |
| Italy x? | | | | | | | | | | | | x | x | | | | | | | | | | x | | | | | | | | |
| Greece | | | | | | | | | | | | x | | x x | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

*Figure 2. Party size (cont.)*

Fringe Parties (<3% electoral results)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finland | | | | | | | | x | | | | | | | | | | | | | | | x | | x | | | | | | |
| Denmark | | | | | | | | | | | | | | | x | | x | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | x<br>x | | x | xx | x | | | | | | | | | | x | | | | | | | | |
| Netherlands | | | | | | | | | | | | | x | | x | | | | | | x x | | | | | | | | | | x |
| Germany | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | |
| France | | | | | | | | | | | | | | | | | | | | | xx | | | x | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | |
| Spain | | | | | | | | x | | | | x | | | | x x | | | x | | x<br>x | | x | | | | | | | | |
| Italy | | | | | | | x | | | | | x | | | | | x | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1993 | | | | 1994 | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | | | | 1999 | | | | 2000 | | | |

not appear to be a geographical correlation in this family with emergence scattered over the years. The Norwegian Senterpartiet (Social-Democrat) holds the record for being the first West European party to place a site online. Its ideological compatriots did not surface until 1.5 years later in the United Kingdom (UK) and the Netherlands, with the bulk having emerged by 1997. The communist onslaught was led by the French Communist Party in 1995 with the four other European parties following in 1996. We question whether there was an outside motivating force leading them to join in the same year, although we do not know the exact start date for France. It is also noteworthy that electorally, communism has now been reduced to a mainly South European phenomenon.The ecologist family appeared mainly between 1994 through the end of 1996. There does not appear to be a geographical correlation in this family with emergence scattered over the years. The Other category, mainly regional parties, initiated a Web presence beginning in mid-1995 and 1999. The bulk of these parties lie in Spain and the UK.

Ideological categorization by "party family" does not appear to be significant because parties on the right and left got involved with the Web fairly early on. What we found, therefore, is that the Christian-Democrat, Left-liberal, extreme socialist, communist, ecologist, or "other" parties do not appear to support a geographical correlation in terms of family because emergence is scattered over the years.

## Size Pattern

The size of parties does appear to have been an important variable in giving small parties (that normally have difficulties accessing the national media) the impetus to get on the Web early on, but not necessarily more so than the larger parties that also made an early presence. The difference was in the forces catapulting the parties onto the Web. For the smaller parties the Web was in theory a leveler in giving them equal access to the netizens and media. For larger parties it was natural to pursue cutting edge technologies hoping for gains in upcoming elections. As we see in Table 5 and Figure 2, parties that received greater than 20% of electoral votes (large parties) began going online in Austria in 1994 and had completed the process by mid-1997 (the size classification is based on Norris, 2000, pp. 152-153). Parties with 3 to 20% of the votes (small parties) were present slightly earlier and those with less than 3% (fringe parties) slightly later. Fringe parties also continued to go online later than the larger parties, probably because they did not have the resources (in terms of money and technical know how) – even though not so much was needed. All in all, it does not seem that the introduction of Web sites has contributed to a "leveling of the playing field" (Norris, 2001, p. 149). But not much more can be said relative to the impact of size and Web presence emergence.

## CONCLUSION

In conclusion, we have found that parties in Northern and Southern Europe, of varied party families and size, were all interested in creating a Web presence — in order to get their message out, or because they did not want to look old-fashioned by not having a Web site. Examining the past has not supported most of the assumptions with which we began. The only substantial statement we can make is that what does seem to play a role in Web presence is upcoming elections. They seem to not only stimulate the initial creation of Web sites but are also key factors in their redesign and currentness. Other parties then appear to quickly imitate the initiators. Ideally, a future study will

also focus on parties not represented in parliament to see if these smaller parties, which generally get left out of the governing system, are using the Web to gain greater exposure.

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## KEY TERMS

**Cyberspace:** A metaphor for describing the non-physical terrain created by computer systems and networks. In a cyberspace people can search and exchange information, communicate, contact public authorities, organize political campaigns, etc. without face-to-face connection or meeting in a physical space.

**Internet:** A global network connecting millions of computers.

**Political Party**: An organized group that selects and nominates candidates for elections of representative bodies.

**Party Family:** A group of parties that share the same ideology and belief-systems.

**National Party System:** Refers to all the parties within a national-institutional context.

**Web Presence:** Refers to having an established existence, through a Web site on the World Wide Web.

**Web Site:** A site (or location) on the World Wide Web. Each Web site contains a home page, which is the first document users see when they enter the site.

**World Wide Web (or simply Web or WWW):** A way of accessing information over the medium of the Internet. It is a system of Internet servers that support specially formatted documents (using a markup language called HTML for HyperText Markup Language) and links to other documents, as well as graphics, audio, and video files.

## ENDNOTES

[1] We would like to acknowledge the following individuals for contributing to the data set as nation experts: Peter Filzmaier, Austria; Michel Bruneel and Jean-Marc Galant, Belgium; Karl Löfgren, Denmark and Sweden; Tuomas J. Alaterä and Vilho Harle, Finland; Laurence Monnoyer-Smith, Thierry Vedel, and Bruno Villalba, France; Gerd Strohmeier, Germany; Irene Martín and Korinna Patelis, Greece; Pierpaolo Naccarella and James L. Newell, Italy; Markus M. Bugge and Anders Ekeland, Norway; Luis Ramiro Fernández, Spain; and Steve Ward, United Kingdom. We (Carlos Cunha – Portugal and Gerrit Voerman – Netherlands) provided the data for our own countries.

[2] It was not possible to acquire reliable and comparable data regarding Internet users in the years before 1997.

[3] The primary focus of party Web sites everywhere is to communicate information about party policy, issues and candidates, not to solicit active participation (Ward, Gibson, & Nixon, 2003). This emphasis on information provision seems to tie in well with the wishes of the average visitor, who according to Dutch research is primarily seeking information, and has much less of a need to interact (Boogers and Voerman, 2004). On the other hand, in campaign times parties are increaslingly becoming successful in using their Web sites to mobilize volunteer and financial support.

[4] The experts for this nation were unable to provide the specific date for the Web site initiation.

[5] The experts for these nations were not always able to provide exact start dates for the relevant parties. In the case of Sweden, not even Webmaster interviews could uncover the information because the officials were not aware of the start dates.

# Disabilities and the E-Clusive Workspace

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## INTRODUCTION

The use and deployment of information and communication technologies (ICTs) in the public and private sectors has opened an array of options, best practices and implementation approaches for workplace (or workspace) operation. The increasingly widespread adoption of these ICTs, while often an efficient means of delivering services, encouraging communication, and facilitating transactions, still excludes sizeable portions of the population (Baker & Fairchild, 2005; Baker & Ward, 2005). Much of the focus of discussions on ICT adoption has assumed that patchy use of ICTs relates principally to socioeconomic variables. A consequence of these kinds of analyses is the omission, in formulating policies that seek to incorporate ICTs into the workplace, of a key group of people with functional limitations that go beyond relatively remediable conditions (e.g., economic, educational, location)—people with disabilities. Some 15 years after the 1990 implementation of the U.S. Americans with Disabilities Act (ADA), the employment rate of U.S. persons with disabilities is only about 30% (Weathers, 2005). This represents significant and underutilized resource and societal costs for unemployed persons with disabilities ranging from $78 billion to $200 billion annually (U.S. Census Bureau, 2000; Worksupports.com, 2000). A similar situation exists in Europe. Dupré and Karjalainen (2003) report that, according to the preliminary results of the "ad hoc module on employment of disabled people of the Spring 2002 round of the Labor Force Survey", "78% of the severely disabled aged 16-64 are outside of the labor force as compared to 27% for those without" long-standing health problems or disabilities (p. 1).

While policymakers generally recognize that the availability of ICTs allow telework to be a realistic work option and a reasonable workplace accommodation for people with disabilities, focused, comprehensive programs targeted at advancing these applications of ICTs for people with disabilities have yet to be developed. Aside from a few token programs such as the interagency website on teleworking, telework.gov, and a handful of laws "encouraging" telework, requiring reporting to the U.S. Congress or establishing telework coordinators (e.g., Public Law 108-447, § 622 (2004), Public Law 108-199, § 627 (2004) and Public Law 106-346, § 359 (2000)), little real attention seems paid to this work modality.

A possible downside to the e-clusive "virtual workspace" is the potential for the inadvertent marginalization and stigmatization of people with disabilities from the employment community. While using ICTs facilitates may increase accessibility to employment and function as reasonable accommodations for people with disabilities, they may also act to decrease (or at least alter) the kinds of social networks that disabled people have within their occupations. This is an important consideration given that limitation of workplace contact (either in terms of degree or attenuation), can increase the likelihood that people with disabilities will occupy positions of inferior power (they will be more dependent) within the work environment. Such a restriction of power affects the ability to affect positive changes in the workplace. Moreover, as noted by Schur, Shields, Kruse, and Schriner (2002), voting "has been found to be strongly and positively related to … employment and union membership which can represent recruitment and mobilization networks" (p. 169). Thus, the failure to integrate people with disabilities into the workplace can also have a significant impact on their ability to exercise political power and influence. It is within this context that this article identifies some of the principal workplace accessibility issues faced by people with disabilities and discusses the use of teleworking as a reasonable workplace accommodation for people with disabilities.

## BACKGROUND

### People with Disabilities: Employment and the Workplace

Using data from the 2001 and 2004 American Community Surveys (ACS), the Rehabilitation Research and Training Center on Demographics and Statistics at Cornell University (2005) reports that the "employment gap between the

employment rates of working-age people with and without sensory, physical, mental, and/or self-care disabilities increased from 37.3 percentage points in 2001 to 38.9 percentage points in 2004, in the US" (p. 4). Since almost 67% of unemployed persons with disabilities state that they would like to work (NOD/Harris Poll—National Organization on Disability/Harris Poll, 2000), persons with disabilities are a significant "hidden labor pool" (Anderson, Bricout, & West, 2001). With just over 14.5 million unemployed 16 to 64 year old Americans having some sort of disability, the societal cost for unemployed persons with disabilities range from $78 billion to $200 billion annually. These costs include lost productivity, Social Security payments and public funds spent on health care and medical services (Worksupports.com, 2000). The U.S. Equal Employment Opportunity Commission's (EEOC) proclamation that telework may be a potential accommodation for persons with disabilities defined by the ADA opens an additional avenue for the employment of U.S. persons with disabilities (Anderson, et al., 2001). As an alternative work arrangement, telework shifts the workplace from a centralized location to which all workers must physically travel to a geographically remote space, potentially miles away from the boss and work colleagues—a workplace at the employee's home, a satellite location, a hotel room (Fetzner, 2003; Peters, Tijdens & Wetzels, 2004; Stanworth, 1997; Sullivan, 2003). As Bricout (2004) writes, for "workers with disabilities home-based telework offers the possibility of ready access to employment unhampered by consideration of distance, fatigue or interpersonal demands" (p. 147).

Bias and discrimination are often significant barriers to employment for persons with disabilities. Employment is highest among persons with sensory disabilities and lowest among persons with mobility and mental impairments (Schur, 2002). The employment of persons with severe disabilities tends to be less than the employment of persons with less severe disabilities (NOD/Harris Poll—National Organization on Disability/Harris Poll, 2000; Bricout, 2004). Kennedy and Olney found an employment rate of 58% amongst persons with disabilities who had experienced discrimination, and a strong correlation of job discrimination and the severity of (disability-based) work limitation. Employers' perceptions of persons with disabilities may affect, unconsciously or consciously, their hiring decisions. For example, employers may fear an increased number of accidents and absences related to disabilities, even though research suggests that employees with disabilities typically have lower accrued compensation costs—$82 vs. $1,564 for employees without disabilities (Graffam, Smith, Shinkfield, & Polzin, 2002). However, it may also be the case that employers are accommodating employees with those disabilities that least affect productivity, or whose disability (or disabilities) is the easiest and least expensive to accommodate (Blanck, Schur, Kruse, Schwochau, & Song, 2003). A 1999 Job Accommodation Network (JAN) survey on workplace accommodations reported that since 1992, 71% of workplace accommodations have cost $500 or less with 20% of those costing nothing (Wireless RERC, 2003).

Schur (2002) found that employment reduces the social isolation experienced by persons with disabilities, as well as increasing the "overall life satisfaction and … feeling of being useful and needed" (p. 344). However, employed persons with disabilities still perceive themselves as both physically and socially isolated in their workplace. In fact, it is common for persons with disabilities to consider their work location as a "dumping ground" for people who cannot otherwise fit into the mainstream workplace, and feel themselves to be victims of harassment in the workplace (Robert, 2003). Compared to employees without disabilities, employees with disabilities tend to receive lower hourly and annual earnings. Moreover, employed persons with disabilities are less likely to be involved in decision making and making a presentation at work (Schur, 2002). On the plus side, employed persons with disabilities frequently report improved self-esteem, and increased social contact and personal satisfaction (Graffam et al., 2002).

The ADA requires U.S. employers to provide "reasonable accommodations" for persons with disabilities. Commonly occurring reasonable accommodations include employer provision of extra supervisory or co-worker attention (68%), establishment of flexible work hours (51%), and provision of a job coach (46%) (Olson, Cioffi, Yovanoff, & Mank, 2001). According to Loprest and Maag, typical environmental workplace accommodations for persons with disabilities include: parking or public transit stops (19%), elevators (17%), work stations (15%), work hours or job restructuring (12%), handrails or ramps (10.4%), Braille, enlarged print, lighting, audio tape and voice synthesizer, technical device or interpreter (2.5%) (Loprest & Maag, 2001). Eighty-two percent (82%) of employers who made accommodations for persons with disabilities provided a facility-accessibility accommodation (Bruyere, 2000).

## Telework: Not Just "Phoning In"

Telework, as an alternative work arrangement, shifts the workplace from a spatially and geographically centralized place of group activity, to a technologically connected albeit remote space, potentially miles away from managers and work colleagues—a workspace at the employee's home, a satellite location, or even a coffee shop (Fetzner, 2003; Peters, Tijdens & Wetzels, 2004; Stanworth, 1997; Sullivan, 2003). In contrast with the more traditional expression, "telecommuting," telework refers specifically

to the reconceptualization of the structure of the assigned work tasks within the virtual environment, the virtual workspace created by use of appropriate ICTs. Such ICTs, including broadband availability, allow for the implementation of the virtual workspace where teleworkers can engage in collaborative activity with both on-site workers and other teleworkers.

Telework is not as new a concept as one would think. One of, if not the first U.S. teleworker was a bank president in Boston who had a phone line installed between his bank and his home in 1877 (Langhoff, 1996). As a generally recognized phenomena as early as the 1950s, technological improvements led people to envision the use of automated technologies to work from home (Mills, Wong-Ellison, Werner, & Clay, 2001). Simpson, Daws, Pini, and Wood (2003) write that the concept gained additional currency in the 1970s "as a response to the need to reduce energy consumption with the oil crisis" (p. 115). More generally, advances in information technologies—broadband and wireless communications, smart-phones, desktop computers, compact facsimile and printing machines—have enabled telework arrangements that can be, in the most robust implementations, conceptualized as creating "virtual workspaces." For people with disabilities, particularly with certain physical conditions that constrained transportations and ordinary workplace interactions, the untethering of "work" from the proximate physical workplace can allow an employment possibility that might be otherwise costly economically or in terms of simple ease of movement or comfort.

Telework represents an underappreciated opportunity for employers, enabling them to tap into new and generally underutilized labor pools—such as persons with disabilities. The U.S. EEOC has acknowledged this, noting that telework arrangements are potential "reasonable accommodations" for persons with disabilities under the ADA. However, the actual implementation of telework for people with disabilities appears to lag behind the kinds of arrangements that are possible with existent information technologies. Tahmincioglu (2003) estimates that only 7% of the employed persons with disabilities work from home 20 hours or more a week.

In the United States, surveys indicate that around 2.8 million employees telework regularly, and that approximately 17% of Americans teleworked full-time while 30% teleworked at least one day a week (U.S. Department of Labor, 2003). According to a recent survey, teleworkers can save employers approximately 63% of absenteeism costs per teleworker per year and 25% of an employee's annual salary due to retention related to employee satisfaction with telework arrangements or around $10,000 in reduced absenteeism and job retention costs (Telework Coalition, 2003). Benefits that accrue go beyond the purely economic to the perceptual. Some 45% of Teleworkers with a separate office in the home perceive an improved quality of life—work, home, and social—because of the telework arrangement (Gibson, Blackwell, Dominicis, & Demerath, 2002; Khaifa & Davidson, 2000; Raines & Leathers, 2001).

Professed ancillary advantages of telework as an alternative work arrangement include environmental improvements resulting from reduced commutes to the workplace, the dispersion of the workforce in light of natural or human-made disasters, and allowing people living in rural or otherwise geographically remote areas to participate more fully in the workforce (Raghuram, London, & Larsen, 2001; Simpson et al., 2003). Other employer-related benefits of telework arrangements can include improved morale, expected reduced real estate cost, and increased employee loyalty. Teleworkers claim an increase in productivity and a reduction in absenteeism because of telework arrangements. Teleworkers themselves report other advantages of telework such as having a more flexible schedule (Raghuram et al., 2001), reduced work-related expenses—clothes, vehicle fuel—and avoiding commuting to and from the traditional office (Gibson et al., 2002).

Even with all of the professed benefits, telework has its critics. The critics tend to focus on two features of telework: First, the remote aspect of telework—the lack of work support, job structure, technology, social interaction and communication, and second, the potential liabilities of telework—U.S. Occupational Safety and Health Administration (OSHA) regulations, and fair labor laws. Critics also express concerns about the costs associated with setting up teleworkers—for example, equipment and remote communication access, and determining who pays for specific components of the telework ICT infrastructure. Employers are increasingly concerned with the problems of securing proprietary information in remote telework locations, reductions in teamwork due to little face-to-face contact between employee members, and remote management problems such as not being able to directly (face-to-face) monitor employee work. Finally, there are concerns about wider impacts, such as disruptions to family and neighbors, which could result in distractions and decreased productivity (Peters et al., 2004). This is a concern of not only employers but also employees. According to Mills, "the traditional styles of management [monitoring employees] often do not work with telecommuting" (Mills et al., 2001). In telework arrangements, managers must transition to a manager of employee performance or facilitator (Gibson et al., 2002; Illegems & Verbeke, 2004; Mills et al., 2001; Swink, 2001; Telework Coalition, 2003).

The widespread adoption of telework may also be slowed by concerns, fears, or misconceptions of employees. Employees fear, not without some justification, long

work hours, potentially becoming "workaholics" because of the lack of discipline or experience self-managing flow of work. Isolation from the mainstream or from the background flow of office "information" might result in limited career development (Illegems & Verbeke, 2004; Khaifa et al., 2000; Mills et al., 2001). While some organizations regularly offer telework as a partial solution to urban traffic and air quality issues, critics, paradoxically, have suggested that telework arrangements will result in increased urban sprawl, fewer jobs in public services such as transportation due to teleworkers being isolated to neighborhoods (Swink, 2001; Mills et al., 2001).

## Social, Cultural, and Policy Considerations

Aside from the narrowly characterized employment and workplace related variables that affect telework as an employment alternative, there are also social and cultural factors may affect the desirability of telework as a reasonable workplace accommodation for people with disabilities. For example, one concern is that teleworking results in increased social isolation rather than being a "community-friendly" form of work (Kamerade & Burchelle, 2004). Persons with disabilities are more likely to report feelings of social isolation, disconnection from their managers, decreased communication with peers, and isolation from the company culture. Thus, if teleworking results in increased social isolation of those workers whose principal form of work is telework, then using telework to accommodate people with disabilities is likely to exacerbate their isolation rather than enhance their social capital or increase the density of their social ties. Employers also express concern that telework arrangements are not in keeping with the current emphasis on teamwork and the need for rapid change and response (Anderson et al., 2001; Gibson et al., 2002; Igbraria & Guimares, 1999).

A second contributing factor closely related to social interaction is job discrimination. According to various studies, anywhere from 10% to 36% of employed persons with disabilities report having experienced job discrimination (NOD/Harris Poll—National Organization on Disability/Harris Poll, 2000; Kennedy & Olney, 2001). Other sources report that the potential job discrimination is one of the principal concerns of teleworkers, especially from the standpoint of career development and promotions. (Anderson et al., 2001; Khaifa et al., 2000; Mills et al., 2001; Igbraria et al., 1999; Robertson, Maynard, & McDevitt, 2003).

Liability is a third factor that may contribute to persons with disabilities not implementing telework arrangements. Ambiguities in legislative and regulatory terminology leave uncertainties regarding employers' liabilities in telework arrangements. Uncertainties include but are not limited to the U.S. OSHA's mandate that employers provide a safe workplace (Mills et al., 2001) and the U.S. Fair Labor Standards Act of 1938's (FLSA's) requirement that employers "pay all nonexempt employees for all hours worked and time-and-one-half for all overtime regardless of where the work is performed" (Mills et al., 2001). The ADA forces a case-by-case, individual approach regarding litigation (Kreismann & Palmer, 2001; Robertson et al., 2003). An individual legal claim can cost employers anywhere from $50,000 to $150,000 in attorney fees, even if the court dismisses the claim (U.S. Commission on Civil Rights, 2003).

An issue that is perhaps more tied to a different, contextual variable related to infrastructure and issues related to telecommunications and the deployment of broadband technologies is remote access to technology. In order to telework, an employee must have ready and consistent access to the technological infrastructure that enables telework arrangements: the Internet, email, wireless communications devices, facsimile, and voice communication. "Virtual teams cannot exist without technology" (Pratt & Associates, 2000). Only 25% of persons with disabilities own a computer and just 20% have Internet access, compared to 66% and 40% of persons without disabilities respectively (Kaye, 2000).

A final contributing factor closely associated with the telework infrastructure factor is cost (Fairweather, 1999). Some employers pay for the cost to implement telework arrangements for their employees considering an investment; others do not. If employers do not pay for the cost of implementing telework arrangements, a large number of persons with disabilities will more than likely not have the financial resources to do so—around 23% of 16 to 64 year old persons with disabilities have an annual income below the U.S. poverty level, compared to around 10% of persons without disabilities (U.S. Census Bureau, 2000).

## FUTURE TRENDS

If telework and virtual workspaces represent positive developments in employment possibilities, and viable approaches to advancing the inclusive workplace, then what policy responses might be reasonable ones? At present, the U.S. ADA states that employers must make "reasonable accommodation" for persons with disabilities unless such results in undue hardship to the employer (Blanck et al., 2003). In addition, the EEOC and the New Freedom Initiative recognize telework as a potential alternative work arrangement for persons with disabilities (Anderson et al., 2001). One approach could be to promote legislation that provides monetary incentives for unem-

ployed persons with disabilities who participate in telework arrangements. Although such legislation has been introduced in the U.S. House and Senate, to date none has become law.

A different type of strategy would be to expand the development of awareness and education outreach campaigns such as the European Union's "eInclusion and eAccessibility Initiative" (Europe's Information Society, 2006). Such a communication campaign provides an avenue for facilitated discourse between vested stakeholders that will not interfere with each stakeholders' other priorities, keeps telework and the employment of persons with disabilities on the agenda and allows the synergy between the two issues to progress along the timeline of the stakeholders. Funding a communication campaign to supplement existing efforts by the U.S. Small Business Administration could increase the involvement of large corporate enterprises with more resources to invest, and larger potential savings related to telework arrangements, as small business only pays around 44% of the U.S. private payroll (Small Business Administration, 2003). An awareness and education communication campaign also has the potential to directly expose employers to persons with disabilities. Research indicates that persons' without disabilities affective attitudes toward persons with disabilities tend to be more positive with greater exposure to persons with disabilities (Popovich, Sacherbaum, Scherbaum, & Polinko, 2003).

## CONCLUSION

Both national and international efforts are required to encourage the progress of research on the impact of teleworking as a workplace accommodation on both employers and people with disabilities (Baker & Fairchild, 2005; Baker & Ward, 2004; Wireless RERC, 2003). Raising awareness of the advantages and disadvantages of using ICTs to create virtual workspaces will likely encourage research of teleworkers with disabilities and the role of computer mediated virtual workspaces as reasonable accommodations. Moreover, a targeted set of public policies should reflect a renewed emphasis on leveraging information technologies to reduce insidious aspects of the digital divide. Such research is needed to understand better the opportunities and challenges specific to teleworkers with disabilities. The research is also an important part of finding ways to increase the political power of people with disabilities and to provide opportunities for people with disabilities to engage in public sector work (e.g., government). Currently, claims and assumptions regarding teleworkers with disabilities result from overlaying research on teleworking and research on employees with disabilities. Without research specific to teleworkers with disabilities, the assumptions and claims made regarding teleworkers and, more specifically, persons with disabilities, will continue to encourage speculations interfering with telework as a viable reasonable accommodation that can increase the employment of persons with disabilities.

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## KEY TERMS

**Americans with Disabilities Act (ADA):** According to the U.S. Department of Justice, Civil Rights Division, Disability Rights Section (2004), the 1990 Americans with Disabilities Act "prohibits discrimination on the basis of disability in employment, state and local government, public accommodations, commercial facilities, transportation, and telecommunications" (p. 1).

**Disability:** As reported by the Disabled People's Association of Singapore (2005), the United Nations Standard Rules on the equalization of opportunities for persons with disabilities says that the "term 'disability' summarizes a great number of different functional limitations occurring in any population in any country in the world. People may be disabled by physical, intellectual or sensory impairment, medical conditions or mental illnesses." Typically such limitations are relativized to "normal human functioning" (World Health Organization) or to major life activities (Americans with Disabilities Act).

**Information and Communication Technologies (ICTS):** ICTs are those technologies (typically electronic) used to store, process and transmit information. Recent examples of ICTs include telephony, satellites and cables, and the Internet. According to the European Commission (2001), "[I]nformation and communications technologies is a term which is currently used to denote a wide range of *services*, *applications*, and *technologies*, using various types of *equipment* and *software*, often running over telecom *networks*."

**Public Policy:** A public policy is a rule, law or guideline established (and typically enforced) by some governmental authority whose goal is to regulate the actions of the people who fall under the jurisdiction of that governmental authority.

**Telecommuting:** While sometimes treated as synonymous with "telework," telecommuting refers to the use of information and communication technologies to communicate with other workers or one or more geographically centralized workplaces to exchange information relevant to work duties and assignments.

**Telework:** Telework is work that occurs outside of the traditional, geographically centralized workplace, in which the worker uses information and communications technologies such as the Internet to complete the work and communicate with the workplace (Bailey, & Kurland, 2002; Bricout, 2004; Fetzner, 2003; Kamerade, et al., 2004; Potter, 2003; Topi, 2004).

**Virtual Workspace:** A virtual workplace is an electronic "space" created by the use of information and communications technologies in which, through the medication of such technologies, workers can perform, interactively and collaboratively, work duties.

# The Dubai E-Government Project

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## INTRODUCTION

Ranked 26th worldwide and second in the Middle East for its e-government initiative, the United Arab Emirates (UAE), and Dubai, in particular, is an excellent example of how e-government might be developed, implemented and advanced as a customer service-based concept (West, 2005).

The e-government project that continues to evolve in Dubai can be credited almost exclusively to the Emirate's leadership as embodied in Sheikh Mohammed Bin Rashid Al Maktoum, Crown Prince of Dubai, his vision and sheer tenacity to make grand ideas a reality.

It is not our intention in this article to suggest that the Dubai e-government project is without challenges and room for improvement. It is our intention, though, to present the Dubai case study as an evolving example of e-government from which to learn.

While the development and implementation of the e-government project is advancing in Dubai at a frenetic pace, the rollout of the concept to the public and the general acceptance and inclusion of the public in the larger governance process is still, to a large extent, a masterful work in progress.

The general global assessment of e-government delivery undertaken by Darrell West (2005) makes it very clear that progress is being witnessed worldwide when it comes to the implementation of e-government ideals. The greatest challenge to e-government, according to West (2005), is at times its very slow pace, its uneven nature and failure to adapt to changing conditions within which it exists. Dubai, in some instances to a lesser degree and others to a greater degree, is experiencing the same problems being experienced globally by those engaged in implementing e-government.

Fortunately, e-government performance in Dubai is improving rapidly, as budget, bureaucracy and institutional forces are pushed towards compliance. But what continues to be fundamentally lacking from Dubai's e-government project is a means of promoting and facilitating authentic e-governance where society as a whole has a means of engaging in meaningful interaction as a participant in the process of governance and not simply the service side of the state.

Dubai is one of seven Emirates that constitute the UAE federation. The country's constitution identifies it as an Arab state, with Islam as its religion and Arabic as its official language. The UAE is a member of the Arab League and the Gulf Cooperation Council (GCC), a regional group that joins the Gulf states of Kuwait, Saudi Arabia, Qatar, Bahrain, UAE and Oman. In general, GCC countries share many political, economic and social characteristics, including high reliance on an imported work force.

In the last decade, Dubai and the UAE have undergone phenomenal change. Fifty years ago, the country had little to no electricity, plumbing or simple infrastructure, such as surfaced roads and bridges. In 1950, there was no hospital and but a single school in Dubai. Dubai was a city comprised of barasti huts (housing made from palm fencing) and clay buildings lining sand streets. As late as the 1970s, according to Timothy Walters (unpublished), the literacy rate of the UAE hovered around 20%, with only a fraction of adults having any formal education.

Today, the landscape of Dubai has been radically transformed. Dubai is experiencing a level of prosperity never before seen. Physically, the city has been morphed from a sleepy regional trading post to the premier economic and tourist hub of the Middle East.

The transformation of Dubai is marked by its rapid installation of a modern infrastructure, the embracing of technology and both the vision and resources to rapidly roll out change to the general population. In 1999, Sheikh Mohammed Bin Rashid Al Maktoum championed the idea of launching a visionary e-government project to set the standard for such endeavours in the Middle East. More recently, in 2005, the idea of a government connecting to at least a large segment of its constituents is quickly becoming a reality.

This article will review why we believe Dubai might be considered an excellent e-government case study in the implementation of e-government as a customer-service concept. This article will also suggest that one of the greatest challenges of any e-government project is to include governance in the equation. This examination is primarily based on a synthesis of government publications available through the e-government portal www.dubai.ae, where examples of the e-government exercise are available, with other accounts of the Dubai e-government project.

## BACKGROUND

According to the UAE Ministry of Economy and Planning, the UAE's population in 2003 was estimated to be 4.041 million (Dubai Development and Investment Authority, 2005). Dubai is the UAE's most populous city, with an estimated population of 1.071 million. Census results from 2000 shows that 80% of Dubai's population is comprised of expatriates. According to official government statistics, UAE nationals constitute 18% of the country's population, followed by other Arabs expatriates at 13%, Asians 63% and Europeans and others 4%. Dubai's population is similar in its diversity to the nation at large (Datadubai.com, 2005; Dubai Development and Investment Authority, 2005).

The diverse expatriate population of Dubai uses language as one tool of cultural expression and interaction. While English is the dominant language in the business and tourism industries, government agencies use both Arabic and English to cater for the Emirate's residents and visitors. In addition, Urdu, Hindi, Farsi, Tagalog, and Russian, along with other languages, are also widely used on a daily basis. Most schools in Dubai offer one or two languages as additional foreign languages for non-native speakers.

International schools in Dubai cater to the myriad of nationalities living in the Emirate. Expatriate children are not admitted to the UAE public schools in the country; therefore, they study in private institutions. Local authorities have licensed K-12 schools offering Lebanese, British, American, French, International Baccalaureate and Indian curricula, to name just a few. American, Canadian and British-styled institutions of higher learning also provide higher studies to nationals and expatriates.

Dubai also plays a role as an international trading site. With an advanced infrastructure that includes world-class ports, airport, roads, free zones, a financial center, banks, insurance sector and retail outlets, to name just a few, Dubai attracts business as well as leisure visitors year round. To promote itself as a trade destination, the Dubai government organizes an annual shopping festival that attracts millions of visitors. In addition, it organizes a summer program of shopping and hotel promotions to revive the local economy during the months when temperatures soar and local residents take their annual leave abroad.

Dubai is one of the Middle East's most successful tourism destinations. According to the World Tourism Organization, Dubai has witnessed steady positive growth as a destination for the past decade, with only a marginal decline during periods of regional wars and instability. In 2002, Dubai achieved 31% growth in tourist arrivals—the world's highest for the year. In 2003, Dubai guests reached 4,980,228, with the majority coming from other Arab countries, Europe, Africa, Russia and the CIS republics and Asia. There is no question that Dubai is a city state in the throngs of rapid development.

## THE IDEA OF E-GOVERNMENT

E-government can be defined as the electronic enablement of services provided or commissioned by the public sector specifically capitalizing upon applications of information and communication technology (ICT) tools to the wide range of service activities undertaken by the state.

The goal of any e-government project is to enhance the effectiveness and efficiency of a government's activities and, in many instances, alter the procedural relationship of the government with the public. This altered government/public relationship typically progresses through several distinct phases, according to Sami Atallah (2001): posting information; two-way communication; exchange of value; integrated service and exchange.

The move towards e-government by many first-world countries is fundamentally altering the government/public relationship on one hand and citizen/business relationship on the other. In the Middle East, change in the government/public and citizen/business relationship is no different.

What is different in the Middle East is the relationship of e-government to e-governance. In many democratic-styled countries, e-government and e-governance projects are being developed concurrently. E-governance might best be understood as the electronic enablement and management of democratic activities, ensuring a degree of fairness, transparency and ultimately participation in the public-policy process of the otherwise disenfranchised (Bovaird, 2005).

E-governence is less about access and more about the style and intent of leadership. E-governence, as Khosrow-Pour (2005) suggests, is about enabling new ways of debating and deciding public policy. E-governance is less an economic investment and more an investment in the populous itself, thereby facilitating a new means of listening and consulting the citizenship.

E-governance, thus, becomes about enabling democratic tendencies and efficient government. The ideals of e-governance are being talked about today across the Middle East in general, but have yet to be adopted in any meaningful way, including in the UAE.

Sami Atallah (2001) suggests that the most striking effect of e-government is seen in the enhancement of the communicative ability of governments. But e-government is not simply the reinvention of the communication structures of governments. E-government is the reinvention of the way the business of governance is conducted. From information delivery, service procurement and delivery,

the manner of conduct of the state is dramatically changing. What is coming about is the imposition of a customer service-centered mentality in the manner in which the state interacts with the population it serves.

The goal of e-government as it is being embraced today worldwide and, in particular, in Dubai, can be summarized as to provide unified quality services (UQS) under the common slogan "the customer first." Unified quality services are being promoted in the context of e-government embracing the use of technology to simplify customer/government transactions and create a better environment for efficient government operations (Dubai eGovernment, 2004).

The process of e-government is much more than simply facilitating UQS. What e-government is facilitating is the complete institutional, cultural change of government internally and as it is perceived by the public itself. What is being advanced is organizational change towards customer relationship management, with the goal being to meet and exceed customer expectations from the start to the end of the transaction (Bovaird, 2005).

## THE DUBAI E-GOVERNMENT EXPERIMENT

The driving force behind e-government in Dubai is Sheikh Mohammed Bin Rashid Al Maktoum. His idea for e-government is embodied in the government's portal, www.dubai.ae, where customers can access a plethora of services being made available to them, in many cases, only electronically.

Sheikh Mohammed has set out two broad objectives for e-government in Dubai:

1. The government of Dubai shall e-enable 90% of its public services by 2007
2. Customers should conduct 50% of e-enabled government transactions through innovative channels by 2007 (Geray, 2004).

The Dubai e-government project is ambitious and premised on the simple idea that anything is possible if the right people are involved. Thus, what is constantly suggested within the Dubai government is that you are either part of the team or not, and those who are not up to the challenge of e-government are free to move on.

By 2007, it is expected that there will be:

1. E-enablement of 90% of public services (including identification of all online and off-line public services in each department and also service prioritization for e-enablement)
2. Implementation of e-service quality guidelines in all departments
3. Implementation of virtual governance by joining administrative boundaries through electronic integration and data sharing
4. Implementation of targeted marketing campaigns
5. Implementation of synergistic e-services to achieve expedited implementation and cost savings to the Dubai government (Geray, 2004).

The key to the success of the Dubai e-government project so far has been the ability of Dubai to re-invent the attitude of public service itself. Nowhere is this reinvention more prevalent than in the Department of Tourism and Commerce Marketing (DTCM). DTCM is a natural success story in Dubai because of the persistence of the Dubai government to continually try to accomplish the impossible and the desire of the Dubai government to see the Emirate become a unique tourist, financial, manufacturing and service destination.

The DTCM activities with e-government focus on connectivity to those who may want to come to Dubai and the eventual ease of their integration into Dubai. From general information to the obtaining of visas to the finding of suitable accommodations, the DTCM e-project embraces the idea of aiding the user first. The department considers its eServices a strategic gateway to the world. DTCM, as of December 2003, had 10 eServices, of which four were transactional and six informational (Dubai eGovernment, June 2004f).

## THE DUBAI DIFFERENCE

What makes Dubai and its e-government initiative different than most other places in the world, according to Sheikha Lubna, CEO of Tejari (the first e-commerce supply chain market in the region), is that contrary to the practices in most parts of the world, where the corporate community and business sectors take the lead and impose their e-initiatives on society. the government sector in Dubai is the real leader in the transition into e-commerce (Dubai eGovernment, August 2004g).

Under the leadership of Sheikh Mohammed Bin Rashid Al Maktoum, the e-government initiative of Dubai has seen amazing advances. According to Sheikh Mohammed, "the e-government concept depends on many factors, two of which are: making essential improvements to the government services provided to the public, and prompting the public sector to deal with its customers as dynamically and easily as the private sector" (Dubai eGovernment, May 2004d, p. 2).

The Dubai e-government initiative has two basic guiding objectives: simplification of government transactions in the emirate, and creation of initiatives to help Dubai assume a leadership position in the IT-driven global economy (Dubai eGovernment, October 2004h).

To operationalize these two objectives, the Dubai e-government project has relied very heavily, but not exclusively, on cultivating a reflexive relationship with the private sector and business community. The Dubai government is very cognizant of the fact that its constituents comprise both individual residents and private industry, and its initiatives serve to satisfy the needs of both. In the case of private industry, the challenge is to get them to buy into the e-government initiatives by making the industry a key component of the goods and services supply train of the state.

According to Sheikh Mohammed Bin Rashid Al Maktoum, the success of any e-government initiative is premised on the symbiotic relationship of economics and social services that can only be realized if state and business interests work as partners.

The rapid movement towards the implementation of e-government and the changed mentality that comes with it has brought its own share of challenges. Dr. Khalid Al Khazraji, Undersecretary at the UAE Ministry of Labor and Social Affairs, considers one of the most significant challenges to the implementation of e-government in Dubai the changing of the attitudes of the employees who must buy into the current government-centered system to a customer-first e-government system. Part of the process of change can take place through re-training. The other, more difficult, aspect of change comes from convincing employees of the benefits of moving towards e-enabled government services (Dubai eGovernment, May 2004d).

Dubai has always been a pioneering state. In April 2000, Sheikh Mohammed Bin Rashid Al Maktoum called for the transition of the Dubai government into the new knowledge age, demanding that the departments of the Dubai government provide their services electronically within no more than 18 months! Between April 2000 and the time of Dubai e-government launch in October 2001, all the infrastructure for the rollout of the e-government project was put into place. After 2 years, Dubai government, through its e-government project, provided more than 600 electronic services. Dubai turned the initiative into a project and the project into an organization (Dubai eGovernment, April 2004c).

What distinguishes Dubai's e-government project from any other world wide is the constant desire to continually innovate. A further example of this innovation was seen in September 2005, when the Dubai government launched the first Arab electronic mobile phone e-government portal. The mobile phone portal was launched with 26 services divided into 10 categories: traffic and roads; health; business; aviation and flights; information about Dubai; information on Islamic issues; Emirates Airline; Real estate; and the Dubai stock market. The project is specifically intended to help enable the prime objective—the greater e-government project of 90% of all government services being available electronically (Dubai eGovernment, October, 2005h).

## DUBAI E-GOVERNMENT IN ACTION

As of August 2004, the Dubai e-government exercise had 1,444 total online services. Of those, 173 were informational, 49 interactive and 1,222 transactional. The completion rate for transactions was 47% (Dubai eGovernment August, 2004g).

As of August 2004, there also were 20 government departments actively participating in the e-government project; this number is larger today, although exact statistics are not available. The Dubai municipality is by far the leading department, with 304 e-government services in total, of which 54 are transactional and 250 are informational. The Dubai Airport Free Zone Authority has 124 e-government services, of which 118 are transactional and 6 are informational. Links to various projects in the Dubai e-government project can be found at www.dubai.ae (Dubai eGovernment, March 2004b).

While Dubai was the first government to move towards e-government in the Middle East in 2001, according to measures of the effectiveness of these services by West (2005), even with its innovative approach, it is not the leader of e-government in the Middle East.

E-government ratings done by West (2005) put the UAE on par with Qatar in 26$^{th}$ place world wide, with an effectiveness rating of 30.1. Bahrain leads the e-government exercise in the Middle East, in 23$^{rd}$ place world wide, with an effectiveness rating of 31.

## FUTURE TRENDS

What is being changed through the Dubai e-government project is the very nature of the state's relationship to its citizens, visitors and businesses. What is being seen is the transformation of residents to customers through the e-government project.

Dubai's e-government project is not, and never has been, intended as a solution to failed government development. No one knows this better than Sheikh Mohammed Bin Rashid Al Maktoum. What makes Dubai's case so interesting is that, for the most part, the state is rebuilding its services as the e-government project itself is being implemented. E-government is being used as a means to

push improvement and enhancement, and not as a stop-gap to brace failed programs and ideas that have become entrenched as part of the system (Atallah, 2001).

But it also needs to be remembered that there is a politico-administrative process at work as e-government is implemented. This politico-administrative process only works when it is understood that residents are not simply customers, but participants in the governmental process (Van Duivenboden, 2005).

For e-government to work, it needs to have a clear strategy that recognizes the commerce aspect of the exercise and simultaneously the governance aspects that are evolving and inextricably linked to effective government.

So far, the UAE, and Dubai in general, is concentrating on the e-government project only. There are hints of more open electronic channels between the Dubai's residents and the decision makers as seen through the Dubai municipality suggestion and complaint service, called "Have your Say." While this service provides a means of tracking the progress of submissions and has a mechanism to reward creative comments, it is a long way from a means of input into the public in the public-policy process of the Emirate (Dubai eGovernment, September 2005a).

## CONCLUSION

There is no question that through the visionary leadership of Dubai and the rapid implementation of ICTs into the communication process of the government e-government has realized success in Dubai.

According to Qassim Sultan Al Banna, the adoption of ICTs and, ultimately, e-government has led to the Dubai government becoming more customer- and quality-centered in its delivery of products and services in an extraordinarily short period of time.

Dubai's e-government project has increased and expanded access to government services by enabling interaction with the Dubai government through a variety of ICTs, from mobile phones to the Internet. In many cases, the adoption of ICTs has actually reduced costs of service delivery by the state by as much as 30%, according to the Dubai government.

But the learning and adoption curve to a completely integrated e-government across society is steep. While the young e-generation is an early adopter, and a significant portion of Dubai's population, there still is much to be done to bring those skeptical of technology on board with the e-government project.

*The 21st century brings with it a new expectation from businesses and individuals who require an environment that is conducive and one in which they can prosper. The Internet revolution is re-shaping the world, and in this New Economy, it is critical for governments to re-invent themselves as it is for business to transform into e-business* (Sheikh Mohammed Bin Rashid Al Maktoum, 2004).

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## KEY TERMS

**E-Culture:** The ordinary societal rudiments of interaction and acquisition taken for granted and sometimes ignored in any society, because they are so common, which are now mediated through ICT. Examples include activities such as conversations with friends via instant messaging or the ability to order goods and services through Web portals like Amazon.com.

**E-Generation:** The demographic born between 1995 and 2005 that has only ever known an environment employing ICTs for everything from entertainment to political participation.

**E-Governance:** The enabling of a new means of listening and consulting the citizenship, thereby enabling democratic tendencies and efficient socio-political development.

**E-Government:** The electronic enablement of all services provided or commissioned by the public sector capitalizing upon specific applications of ICT tools to the wide range of societal activities undertaken by the state.

**E-Services:** The exchange of goods and/or activities that in the past involved face-to-face communication but are now facilitated through an electronic, people-free interface.

**Information Communication Technology (ICT):** Devices utilizing microchip technology that enable enhanced information exchange.

**Unified Quality Services (UQS):** The use of technology to simplify customer/government transactions and create a better environment for efficient government operations.

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## KEY TERMS

**Americans with Disabilities Act (ADA):** According to the U.S. Department of Justice, Civil Rights Division, Disability Rights Section (2004), the 1990 Americans with Disabilities Act "prohibits discrimination on the basis of disability in employment, state and local government, public accommodations, commercial facilities, transportation, and telecommunications" (p. 1).

**Disability:** As reported by the Disabled People's Association of Singapore (2005), the United Nations Standard Rules on the equalization of opportunities for persons with disabilities says that the "term 'disability' summarizes a great number of different functional limitations occurring in any population in any country in the world. People may be disabled by physical, intellectual or sensory impairment, medical conditions or mental illnesses." Typically such limitations are relativized to "normal human functioning" (World Health Organization) or to major life activities (Americans with Disabilities Act).

**Information and Communication Technologies (ICTS):** ICTs are those technologies (typically electronic) used to store, process and transmit information. Recent examples of ICTs include telephony, satellites and cables, and the Internet. According to the European Commission (2001), "[I]nformation and communications technologies is a term which is currently used to denote a wide range of *services*, *applications*, and *technologies*, using various types of *equipment* and *software*, often running over telecom *networks*."

**Public Policy:** A public policy is a rule, law or guideline established (and typically enforced) by some governmental authority whose goal is to regulate the actions of the people who fall under the jurisdiction of that governmental authority.

**Telecommuting:** While sometimes treated as synonymous with "telework," telecommuting refers to the use of information and communication technologies to communicate with other workers or one or more geographically centralized workplaces to exchange information relevant to work duties and assignments.

**Telework:** Telework is work that occurs outside of the traditional, geographically centralized workplace, in which the worker uses information and communications technologies such as the Internet to complete the work and communicate with the workplace (Bailey, & Kurland, 2002; Bricout, 2004; Fetzner, 2003; Kamerade, et al., 2004; Potter, 2003; Topi, 2004).

**Virtual Workspace:** A virtual workplace is an electronic "space" created by the use of information and communications technologies in which, through the medication of such technologies, workers can perform, interactively and collaboratively, work duties.

# The Dubai E-Government Project

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## INTRODUCTION

Ranked 26th worldwide and second in the Middle East for its e-government initiative, the United Arab Emirates (UAE), and Dubai, in particular, is an excellent example of how e-government might be developed, implemented and advanced as a customer service-based concept (West, 2005).

The e-government project that continues to evolve in Dubai can be credited almost exclusively to the Emirate's leadership as embodied in Sheikh Mohammed Bin Rashid Al Maktoum, Crown Prince of Dubai, his vision and sheer tenacity to make grand ideas a reality.

It is not our intention in this article to suggest that the Dubai e-government project is without challenges and room for improvement. It is our intention, though, to present the Dubai case study as an evolving example of e-government from which to learn.

While the development and implementation of the e-government project is advancing in Dubai at a frenetic pace, the rollout of the concept to the public and the general acceptance and inclusion of the public in the larger governance process is still, to a large extent, a masterful work in progress.

The general global assessment of e-government delivery undertaken by Darrell West (2005) makes it very clear that progress is being witnessed worldwide when it comes to the implementation of e-government ideals. The greatest challenge to e-government, according to West (2005), is at times its very slow pace, its uneven nature and failure to adapt to changing conditions within which it exists. Dubai, in some instances to a lesser degree and others to a greater degree, is experiencing the same problems being experienced globally by those engaged in implementing e-government.

Fortunately, e-government performance in Dubai is improving rapidly, as budget, bureaucracy and institutional forces are pushed towards compliance. But what continues to be fundamentally lacking from Dubai's e-government project is a means of promoting and facilitating authentic e-governance where society as a whole has a means of engaging in meaningful interaction as a participant in the process of governance and not simply the service side of the state.

Dubai is one of seven Emirates that constitute the UAE federation. The country's constitution identifies it as an Arab state, with Islam as its religion and Arabic as its official language. The UAE is a member of the Arab League and the Gulf Cooperation Council (GCC), a regional group that joins the Gulf states of Kuwait, Saudi Arabia, Qatar, Bahrain, UAE and Oman. In general, GCC countries share many political, economic and social characteristics, including high reliance on an imported work force.

In the last decade, Dubai and the UAE have undergone phenomenal change. Fifty years ago, the country had little to no electricity, plumbing or simple infrastructure, such as surfaced roads and bridges. In 1950, there was no hospital and but a single school in Dubai. Dubai was a city comprised of barasti huts (housing made from palm fencing) and clay buildings lining sand streets. As late as the 1970s, according to Timothy Walters (unpublished), the literacy rate of the UAE hovered around 20%, with only a fraction of adults having any formal education.

Today, the landscape of Dubai has been radically transformed. Dubai is experiencing a level of prosperity never before seen. Physically, the city has been morphed from a sleepy regional trading post to the premier economic and tourist hub of the Middle East.

The transformation of Dubai is marked by its rapid installation of a modern infrastructure, the embracing of technology and both the vision and resources to rapidly roll out change to the general population. In 1999, Sheikh Mohammed Bin Rashid Al Maktoum championed the idea of launching a visionary e-government project to set the standard for such endeavours in the Middle East. More recently, in 2005, the idea of a government connecting to at least a large segment of its constituents is quickly becoming a reality.

This article will review why we believe Dubai might be considered an excellent e-government case study in the implementation of e-government as a customer-service concept. This article will also suggest that one of the greatest challenges of any e-government project is to include governance in the equation. This examination is primarily based on a synthesis of government publications available through the e-government portal www.dubai.ae, where examples of the e-government exercise are available, with other accounts of the Dubai e-government project.

## BACKGROUND

According to the UAE Ministry of Economy and Planning, the UAE's population in 2003 was estimated to be 4.041 million (Dubai Development and Investment Authority, 2005). Dubai is the UAE's most populous city, with an estimated population of 1.071 million. Census results from 2000 shows that 80% of Dubai's population is comprised of expatriates. According to official government statistics, UAE nationals constitute 18% of the country's population, followed by other Arabs expatriates at 13%, Asians 63% and Europeans and others 4%. Dubai's population is similar in its diversity to the nation at large (Datadubai.com, 2005; Dubai Development and Investment Authority, 2005).

The diverse expatriate population of Dubai uses language as one tool of cultural expression and interaction. While English is the dominant language in the business and tourism industries, government agencies use both Arabic and English to cater for the Emirate's residents and visitors. In addition, Urdu, Hindi, Farsi, Tagalog, and Russian, along with other languages, are also widely used on a daily basis. Most schools in Dubai offer one or two languages as additional foreign languages for non-native speakers.

International schools in Dubai cater to the myriad of nationalities living in the Emirate. Expatriate children are not admitted to the UAE public schools in the country; therefore, they study in private institutions. Local authorities have licensed K-12 schools offering Lebanese, British, American, French, International Baccalaureate and Indian curricula, to name just a few. American, Canadian and British-styled institutions of higher learning also provide higher studies to nationals and expatriates.

Dubai also plays a role as an international trading site. With an advanced infrastructure that includes world-class ports, airport, roads, free zones, a financial center, banks, insurance sector and retail outlets, to name just a few, Dubai attracts business as well as leisure visitors year round. To promote itself as a trade destination, the Dubai government organizes an annual shopping festival that attracts millions of visitors. In addition, it organizes a summer program of shopping and hotel promotions to revive the local economy during the months when temperatures soar and local residents take their annual leave abroad.

Dubai is one of the Middle East's most successful tourism destinations. According to the World Tourism Organization, Dubai has witnessed steady positive growth as a destination for the past decade, with only a marginal decline during periods of regional wars and instability. In 2002, Dubai achieved 31% growth in tourist arrivals—the world's highest for the year. In 2003, Dubai guests reached 4,980,228, with the majority coming from other Arab countries, Europe, Africa, Russia and the CIS republics and Asia. There is no question that Dubai is a city state in the throngs of rapid development.

## THE IDEA OF E-GOVERNMENT

E-government can be defined as the electronic enablement of services provided or commissioned by the public sector specifically capitalizing upon applications of information and communication technology (ICT) tools to the wide range of service activities undertaken by the state.

The goal of any e-government project is to enhance the effectiveness and efficiency of a government's activities and, in many instances, alter the procedural relationship of the government with the public. This altered government/public relationship typically progresses through several distinct phases, according to Sami Atallah (2001): posting information; two-way communication; exchange of value; integrated service and exchange.

The move towards e-government by many first-world countries is fundamentally altering the government/public relationship on one hand and citizen/business relationship on the other. In the Middle East, change in the government/public and citizen/business relationship is no different.

What is different in the Middle East is the relationship of e-government to e-governance. In many democratic-styled countries, e-government and e-governance projects are being developed concurrently. E-governance might best be understood as the electronic enablement and management of democratic activities, ensuring a degree of fairness, transparency and ultimately participation in the public-policy process of the otherwise disenfranchised (Bovaird, 2005).

E-governence is less about access and more about the style and intent of leadership. E-governence, as Khosrow-Pour (2005) suggests, is about enabling new ways of debating and deciding public policy. E-governance is less an economic investment and more an investment in the populous itself, thereby facilitating a new means of listening and consulting the citizenship.

E-governance, thus, becomes about enabling democratic tendencies and efficient government. The ideals of e-governance are being talked about today across the Middle East in general, but have yet to be adopted in any meaningful way, including in the UAE.

Sami Atallah (2001) suggests that the most striking effect of e-government is seen in the enhancement of the communicative ability of governments. But e-government is not simply the reinvention of the communication structures of governments. E-government is the reinvention of the way the business of governance is conducted. From information delivery, service procurement and delivery,

the manner of conduct of the state is dramatically changing. What is coming about is the imposition of a customer service-centered mentality in the manner in which the state interacts with the population it serves.

The goal of e-government as it is being embraced today worldwide and, in particular, in Dubai, can be summarized as to provide unified quality services (UQS) under the common slogan "the customer first." Unified quality services are being promoted in the context of e-government embracing the use of technology to simplify customer/government transactions and create a better environment for efficient government operations (Dubai eGovernment, 2004).

The process of e-government is much more than simply facilitating UQS. What e-government is facilitating is the complete institutional, cultural change of government internally and as it is perceived by the public itself. What is being advanced is organizational change towards customer relationship management, with the goal being to meet and exceed customer expectations from the start to the end of the transaction (Bovaird, 2005).

## THE DUBAI E-GOVERNMENT EXPERIMENT

The driving force behind e-government in Dubai is Sheikh Mohammed Bin Rashid Al Maktoum. His idea for e-government is embodied in the government's portal, www.dubai.ae, where customers can access a plethora of services being made available to them, in many cases, only electronically.

Sheikh Mohammed has set out two broad objectives for e-government in Dubai:

1. The government of Dubai shall e-enable 90% of its public services by 2007
2. Customers should conduct 50% of e-enabled government transactions through innovative channels by 2007 (Geray, 2004).

The Dubai e-government project is ambitious and premised on the simple idea that anything is possible if the right people are involved. Thus, what is constantly suggested within the Dubai government is that you are either part of the team or not, and those who are not up to the challenge of e-government are free to move on.

By 2007, it is expected that there will be:

1. E-enablement of 90% of public services (including identification of all online and off-line public services in each department and also service prioritization for e-enablement)
2. Implementation of e-service quality guidelines in all departments
3. Implementation of virtual governance by joining administrative boundaries through electronic integration and data sharing
4. Implementation of targeted marketing campaigns
5. Implementation of synergistic e-services to achieve expedited implementation and cost savings to the Dubai government (Geray, 2004).

The key to the success of the Dubai e-government project so far has been the ability of Dubai to re-invent the attitude of public service itself. Nowhere is this reinvention more prevalent than in the Department of Tourism and Commerce Marketing (DTCM). DTCM is a natural success story in Dubai because of the persistence of the Dubai government to continually try to accomplish the impossible and the desire of the Dubai government to see the Emirate become a unique tourist, financial, manufacturing and service destination.

The DTCM activities with e-government focus on connectivity to those who may want to come to Dubai and the eventual ease of their integration into Dubai. From general information to the obtaining of visas to the finding of suitable accommodations, the DTCM e-project embraces the idea of aiding the user first. The department considers its eServices a strategic gateway to the world. DTCM, as of December 2003, had 10 eServices, of which four were transactional and six informational (Dubai eGovernment, June 2004f).

## THE DUBAI DIFFERENCE

What makes Dubai and its e-government initiative different than most other places in the world, according to Sheikha Lubna, CEO of Tejari (the first e-commerce supply chain market in the region), is that contrary to the practices in most parts of the world, where the corporate community and business sectors take the lead and impose their e-initiatives on society. the government sector in Dubai is the real leader in the transition into e-commerce (Dubai eGovernment, August 2004g).

Under the leadership of Sheikh Mohammed Bin Rashid Al Maktoum, the e-government initiative of Dubai has seen amazing advances. According to Sheikh Mohammed, "the e-government concept depends on many factors, two of which are: making essential improvements to the government services provided to the public, and prompting the public sector to deal with its customers as dynamically and easily as the private sector" (Dubai eGovernment, May 2004d, p. 2).

The Dubai e-government initiative has two basic guiding objectives: simplification of government transactions in the emirate, and creation of initiatives to help Dubai assume a leadership position in the IT-driven global economy (Dubai eGovernment, October 2004h).

To operationalize these two objectives, the Dubai e-government project has relied very heavily, but not exclusively, on cultivating a reflexive relationship with the private sector and business community. The Dubai government is very cognizant of the fact that its constituents comprise both individual residents and private industry, and its initiatives serve to satisfy the needs of both. In the case of private industry, the challenge is to get them to buy into the e-government initiatives by making the industry a key component of the goods and services supply train of the state.

According to Sheikh Mohammed Bin Rashid Al Maktoum, the success of any e-government initiative is premised on the symbiotic relationship of economics and social services that can only be realized if state and business interests work as partners.

The rapid movement towards the implementation of e-government and the changed mentality that comes with it has brought its own share of challenges. Dr. Khalid Al Khazraji, Undersecretary at the UAE Ministry of Labor and Social Affairs, considers one of the most significant challenges to the implementation of e-government in Dubai the changing of the attitudes of the employees who must buy into the current government-centered system to a customer-first e-government system. Part of the process of change can take place through re-training. The other, more difficult, aspect of change comes from convincing employees of the benefits of moving towards e-enabled government services (Dubai eGovernment, May 2004d).

Dubai has always been a pioneering state. In April 2000, Sheikh Mohammed Bin Rashid Al Maktoum called for the transition of the Dubai government into the new knowledge age, demanding that the departments of the Dubai government provide their services electronically within no more than 18 months! Between April 2000 and the time of Dubai e-government launch in October 2001, all the infrastructure for the rollout of the e-government project was put into place. After 2 years, Dubai government, through its e-government project, provided more than 600 electronic services. Dubai turned the initiative into a project and the project into an organization (Dubai eGovernment, April 2004c).

What distinguishes Dubai's e-government project from any other world wide is the constant desire to continually innovate. A further example of this innovation was seen in September 2005, when the Dubai government launched the first Arab electronic mobile phone e-government portal. The mobile phone portal was launched with 26 services divided into 10 categories: traffic and roads; health; business; aviation and flights; information about Dubai; information on Islamic issues; Emirates Airline; Real estate; and the Dubai stock market. The project is specifically intended to help enable the prime objective—the greater e-government project of 90% of all government services being available electronically (Dubai eGovernment, October, 2005h).

## DUBAI E-GOVERNMENT IN ACTION

As of August 2004, the Dubai e-government exercise had 1,444 total online services. Of those, 173 were informational, 49 interactive and 1,222 transactional. The completion rate for transactions was 47% (Dubai eGovernment August, 2004g).

As of August 2004, there also were 20 government departments actively participating in the e-government project; this number is larger today, although exact statistics are not available. The Dubai municipality is by far the leading department, with 304 e-government services in total, of which 54 are transactional and 250 are informational. The Dubai Airport Free Zone Authority has 124 e-government services, of which 118 are transactional and 6 are informational. Links to various projects in the Dubai e-government project can be found at www.dubai.ae (Dubai eGovernment, March 2004b).

While Dubai was the first government to move towards e-government in the Middle East in 2001, according to measures of the effectiveness of these services by West (2005), even with its innovative approach, it is not the leader of e-government in the Middle East.

E-government ratings done by West (2005) put the UAE on par with Qatar in 26$^{th}$ place world wide, with an effectiveness rating of 30.1. Bahrain leads the e-government exercise in the Middle East, in 23$^{rd}$ place world wide, with an effectiveness rating of 31.

## FUTURE TRENDS

What is being changed through the Dubai e-government project is the very nature of the state's relationship to its citizens, visitors and businesses. What is being seen is the transformation of residents to customers through the e-government project.

Dubai's e-government project is not, and never has been, intended as a solution to failed government development. No one knows this better than Sheikh Mohammed Bin Rashid Al Maktoum. What makes Dubai's case so interesting is that, for the most part, the state is rebuilding its services as the e-government project itself is being implemented. E-government is being used as a means to

push improvement and enhancement, and not as a stop-gap to brace failed programs and ideas that have become entrenched as part of the system (Atallah, 2001).

But it also needs to be remembered that there is a politico-administrative process at work as e-government is implemented. This politico-administrative process only works when it is understood that residents are not simply customers, but participants in the governmental process (Van Duivenboden, 2005).

For e-government to work, it needs to have a clear strategy that recognizes the commerce aspect of the exercise and simultaneously the governance aspects that are evolving and inextricably linked to effective government.

So far, the UAE, and Dubai in general, is concentrating on the e-government project only. There are hints of more open electronic channels between the Dubai's residents and the decision makers as seen through the Dubai municipality suggestion and complaint service, called "Have your Say." While this service provides a means of tracking the progress of submissions and has a mechanism to reward creative comments, it is a long way from a means of input into the public in the public-policy process of the Emirate (Dubai eGovernment, September 2005a).

## CONCLUSION

There is no question that through the visionary leadership of Dubai and the rapid implementation of ICTs into the communication process of the government e-government has realized success in Dubai.

According to Qassim Sultan Al Banna, the adoption of ICTs and, ultimately, e-government has led to the Dubai government becoming more customer- and quality-centered in its delivery of products and services in an extraordinarily short period of time.

Dubai's e-government project has increased and expanded access to government services by enabling interaction with the Dubai government through a variety of ICTs, from mobile phones to the Internet. In many cases, the adoption of ICTs has actually reduced costs of service delivery by the state by as much as 30%, according to the Dubai government.

But the learning and adoption curve to a completely integrated e-government across society is steep. While the young e-generation is an early adopter, and a significant portion of Dubai's population, there still is much to be done to bring those skeptical of technology on board with the e-government project.

*The 21st century brings with it a new expectation from businesses and individuals who require an environment that is conducive and one in which they can prosper. The Internet revolution is re-shaping the world, and in this New Economy, it is critical for governments to re-invent themselves as it is for business to transform into e-business* (Sheikh Mohammed Bin Rashid Al Maktoum, 2004).

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## KEY TERMS

**E-Culture:** The ordinary societal rudiments of interaction and acquisition taken for granted and sometimes ignored in any society, because they are so common, which are now mediated through ICT. Examples include activities such as conversations with friends via instant messaging or the ability to order goods and services through Web portals like Amazon.com.

**E-Generation:** The demographic born between 1995 and 2005 that has only ever known an environment employing ICTs for everything from entertainment to political participation.

**E-Governance:** The enabling of a new means of listening and consulting the citizenship, thereby enabling democratic tendencies and efficient socio-political development.

**E-Government:** The electronic enablement of all services provided or commissioned by the public sector capitalizing upon specific applications of ICT tools to the wide range of societal activities undertaken by the state.

**E-Services:** The exchange of goods and/or activities that in the past involved face-to-face communication but are now facilitated through an electronic, people-free interface.

**Information Communication Technology (ICT):** Devices utilizing microchip technology that enable enhanced information exchange.

**Unified Quality Services (UQS):** The use of technology to simplify customer/government transactions and create a better environment for efficient government operations.

# e-ASEAN and Regional Integration in South East Asia

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## INTRODUCTION

As a relatively new feature of the digital revolution in the Association of Southeast Asian Nations (ASEAN), e-ASEAN was initiated by the ASEAN economic ministers in September 1999 and endorsed by ASEAN leaders at their summit in Manila in November the same year, when the e-ASEAN Task Force was also set up (ASEAN Secretariat, 2003). At the Fourth ASEAN Informal Summit in Singapore in November 2000, a Framework Agreement was signed to serve as the legal foundation for the e-ASEAN initiative. To ensure success, the Senior Economic Officials Meeting (SEOM) was tasked to supervise, coordinate, and review the implementation of the e-ASEAN Framework Agreement. As stipulated in the e-ASEAN Framework Agreement, the SEOM reports to the ASEAN Economic Ministers (AEM) and assists the AEM in all matters concerning this Agreement (ASEAN, 2000, Article 13).

While there is no lack of literature discussing trade liberalisation and transborder cooperation in the ASEAN region, the impact of new information and communications technologies (ICTs) on the development of regionalism, and *vice versa*, remains a rather neglected area of study (Dai, 2003). The purpose of this article is to investigate the implications of the e-ASEAN initiative for regional cooperation and integration in South East Asia in the information age. In particular, the key challenges to achieving the objectives of the e-ASEAN initiative will be analysed.

## BACKGROUND

It is widely perceived that new ICTs can significantly advance transnational co-operation and regional integration in both economic and political terms (Bangemann et al. 1994; European Commission, 2000). Transnational flows of communication are synonymous to the decline in the importance of national, geographical, and institutional boundaries (Castells, 1996). The launch of the European Information Society in the early 1990s serves as an example of public policy based on the notion that new ICTs can be a positive factor to regional integration (Dai, 2000; Federal Europe, 1995).

Generally speaking, e-ASEAN is "to develop a broad-based and comprehensive action plan including physical, legal, logistical, social and economic infrastructure needed to promote an ASEAN e-space, as part of an ASEAN positioning and branding strategy" (ASEAN Secretariat, 2003). Internally, the e-ASEAN initiative is to use ICTs "to speed up economic integration of the group" and, externally, to "help them compete better in the global economy" (Ng & Nurbanum, 2002, p. 39).

The promotion of regional economic growth and acceleration of regional peace and stability have been the key objectives of ASEAN since its establishment in 1967. In today's globally competitive world, ASEAN officials argue, "regionalism has to take on a larger meaning and scope than market integration alone" (ASEAN Secretary-General, 2000). It is perceived vital that, in close cooperation, ASEAN members endeavour "to acquire the technological prowess without which the ASEAN nations cannot hope to move forward economically" (ASEAN Secretary-General, 2000). A key question to be asked is whether or not the global communications revolution can be advantageous to regional integration in South East Asia.

## E-ASEAN AND REGIONAL COOPERATION: CRITICAL ISSUES

Intra-regional cooperation among member states is manifested in the aims of e-ASEAN Framework Agreement: (1) co-operation to develop, strengthen and enhance the competitiveness of the ICT sector in ASEAN; (2) co-operation to reduce the digital divide within individual ASEAN member states and amongst ASEAN member states; (3) co-operation between the public and private sectors in realising e-ASEAN; and (4) the liberalisation of trade in ICT products, ICT services and investments to support the e-ASEAN initiative (ASEAN, 2000, Article 1).

In order to achieve their objectives, ASEAN countries are committed to undertaking the following measures through the e-ASEAN initiative (ASEAN, 2000, Article 2):

- Facilitating the establishment of the ASEAN Information Infrastructure
- Facilitating the growth of electronic commerce in ASEAN
- Promoting and facilitating the liberalisation of trade in ICT products, ICT services, and of investments in support of the e-ASEAN initiative
- Promoting and facilitating investments in the production of ICT products and the provision of ICT services
- Developing an e-society in ASEAN and capacity building to reduce the digital divide within individual ASEAN Member States and amongst ASEAN Member States
- Promoting the use of ICT applications in the delivery of government services (e-government)
- Enabling advanced member states to assist the lagging member states to undertake capacity building

The signing of the e-ASEAN Framework Agreement has generated much enthusiasm within the public and private sectors across the ASEAN region. This is in part manifested in the large number of transnational ICT projects established in response to the launch of e-ASEAN involving project partners from different member states. Of a total of 40 ICT projects, 22 are within the field of e-commerce and the rest address the new and specialised market areas such as e-society, Information Infrastructure and e-governance (Dai, 2003). The dominance of e-commerce projects, in terms of the number of projects, serves as an indication that commercial organisations in the private sector are convinced of the potential opportunities to be afforded by e-ASEAN for promoting transnational e-commerce activities.

To make e-ASEAN a success, ASEAN countries would have to address a number of important issues. Among others, the existence of an intra-regional digital divide, national differences in the provision and application of cyberlaws and the competitive relationship between some ASEAN member states are the focal points of public debate.

## Digital Inequality in ASEAN

Access to ICTs in ASEAN remains significantly uneven. Data presented in Table 1 shows a general trend in ASEAN: the region is clearly divided into countries moving along the fast lanes of the information superhighway and those crawling along the slow lanes. Singapore, Malaysia, and Brunei are the three ASEAN countries that are far ahead of the other member states in terms of penetration rate of main telephone lines, mobile phones, PCs (personal computers), and, last but not least, the Internet.

In 2000, when main telephone line and mobile phone penetration rate reached 484 and 684 per 1000 people (or 48.4% and 68.4%) respectively in Singapore, the corresponding rates for Myanmar were 6 and 0 per 1000 people and 8 and 2 for Laos. Commenting on the present situation of the telecommunications industry in Myanmar, the CIA (Central Intelligence Agency) believes the sector "barely meets minimum requirements for local and intercity service for business and government" (CIA, 2005a).

Concerning the Internet sector, the contrast between the advanced and the lagging countries in ASEAN adds another dimension of the intra-regional digital divide: while 30% of Singaporeans and just under 16% of Malaysians were Internet users in 2000, the proportion of Internet

*Table 1. Access to ICTs in ASEAN, 2000 (Source: Based on figures from World Bank [2002], CIA [2005b] and Dai [2003]).*

| Country | Telephone mainlines per 1000 people* | Mobile phones per 1000 people* | PCs per 1000 people* | Internet users (% of population)* | GDP per capita, PPP in US$** |
|---|---|---|---|---|---|
| Brunei | 245 | 289 | 70.1 | 8.82 | 18,600 |
| Cambodia | 2 | 10 | 1.1 | 0.05 | 1,900 |
| Indonesia | 31 | 17 | 9.9 | 0.95 | 3,200 |
| Laos | 8 | 2 | 2.6 | 0.11 | 1,700 |
| Malaysia | 199 | 213 | 103.1 | 15.88 | 9,000 |
| Myanmar | 6 | 0 | 1.1 | 0.01 | 1,800 |
| Philippines | 40 | 84 | 19.3 | 2.65 | 4,600 |
| Singapore | 484 | 684 | 483.1 | 30.00 | 23,700 |
| Thailand | 92 | 50 | 24.3 | 3.79 | 7,400 |
| Vietnam | 32 | 10 | 8.8 | 0.25 | 2,500 |

*Notes: * Adapted from World Bank (2002) and Dai (2003); **All GDP figures are Estimated Purchasing Power Parity (PPP) of 2003, except for Brunei, for which the PPP figure is for 2002.*

*Table 2. Cyberlaws in ASEAN*

| Member State | Cyberlaw |
|---|---|
| Malaysia | • The Communications and Multimedia Act (1998)<br>• The Malaysian Communications and Multimedia Commission Act (1998)<br>• The Digital Signature Act (1997)<br>• The Computer Crimes Act (1997)<br>• The Telemedicine Act (1997) |
| Singapore | • Electronic Transactions Act (1998) |
| Brunei | • Electronic Transactions Order (2000) |
| Thailand | • Electronic Transactions Bill (Draft) |
| Philippines | • Electronic Commerce Act (2000) |

users among the population in the CLMV (Cambodia, Laos, Myanmar, and Vietnam) and Indonesia was below the 1% level.

The intra-regional digital divide in ASEAN does not come as a surprise. Rather, the picture of digital divide between ASEAN countries is in line with the differentiation in GDP per capita. Figures in Table 1 indicate that the three leading countries (Singapore, Brunei, and Malaysia) with higher ICT deployment rates are actually the three countries with much higher GDP per capita. To address the challenges posed by the digital divide, therefore, it is important to bear in mind that uneven access to ICTs is more than often associated with the varying levels of economic development.

## Regional Governance of Cyberspace

One of the key objectives of the e-ASEAN initiative is to promote the harmonisation of cyberlaws across ASEAN. The e-ASEAN Framework Agreement states that "Member States shall adopt electronic commerce regulation and legislative frameworks that create trust and confidence for consumers and facilitate the transformation of businesses towards the development of e-ASEAN" (ASEAN, 2000).

The harmonisation of cyberlaws in ASEAN is faced with fundamental challenges. First, in addition to the digital divide in the sense of uneven access to ICTs, there is a gap in the provision of cyberlaws between different ASEAN countries. While some countries, notably Malaysia, have already become regional as well as world pioneers in enacting cyberlaws, others have hardly made any progress in the same field (see Table 2 for a list of cyberlaws in ASEAN).

The second challenge comes from the fact that social and political systems vary from country to country within the ASEAN region. Judged by their attitude towards the Internet, states in East and South East Asia fall into three different categories including the following (Hachigian, 2002):

- States with severely restrictive policies and rules towards all public use of the Internet (e.g., Myanmar and North Korea)
- States with moderately restrictive rules towards Internet access and contents (e.g., Vietnam, Singapore and China)
- States that actively promote Internet access and allow for online political pluralism, (e.g., Malaysia)

The different socio-political systems currently prevailing in ASEAN constitute a big challenge to the region's plan for harmonising cyberlaws for the simple reason that online contents and behaviours acceptable in one country may not necessarily be acceptable in another.

## National vs. Regional Interests

In ASEAN countries, there is no lack of high profile ICT initiatives. For example, the Singaporean government has embarked upon an information age vision and strategy to "develop Singapore into a vibrant and dynamic global Infocomm Capital with a thriving and prosperous infocomm-savvy e-Society" (Infocomm Development Authority of Singapore, 2000, p. 5). Following closely the development in Singapore, the Malaysian government has developed a comprehensive strategy to fundamentally transform Malaysia from primarily an agricultural economy now into a developed country by the year 2020 and one of the policy measures for achieving this vision is the Multimedia Super Corridor (MSC) initiative. These national initiatives in ASEAN, however, remain largely disconnected and piecemeal efforts at the national, rather than regional, level—there seems to be a lack of any regional coordination.

Together, Singapore and Malaysia are arguably the two most ICT-savvy member states in the ASEAN region. This is reflected in the fact that these two countries

have already put in place well-developed information age policy and strategies as well as cyberlaws, ahead of the other ASEAN countries. Not surprisingly, both Singapore and Malaysia would like to become *the* ICT hub for the South East Asian region. In this respect, Singapore's Intelligent Island initiative and Malaysia's MSC initiative are in direct competition—they compete for attracting external attention and inward investment. It remains to be seen whether this kind of competitive scenario could be changed and turned into genuinely interconnected initiatives. If this happened, ASEAN countries' common endeavour, that is, the e-ASEAN initiative, would be of much more substance.

## FUTURE TRENDS

Given the critical issues faced by e-ASEAN, the overall impact of the initiative is broadly viewed as a positive one. More specifically, this impact is manifested in two ways: internally the initiative works as a positive factor to the process of regional integration among ASEAN members and, externally, it serves as a new mode of governance of the digital revolution at levels beyond the nation state.

Firstly, under the auspices of e-ASEAN, the promotion of Internet usage by individuals, businesses, and government organisations throughout the region has already established an additional platform for cross-border (or borderless) communication and transactions. Although there is an intra-regional digital divide between the member states, the level of Internet access and usage is improving throughout ASEAN. It is not unreasonable to believe that the Internet, as a cost-effective way of social and business communication, will play an even bigger role in promoting regional integration - national borders are still there but cross-border communication and e-commerce is already a reality on the Internet.

Secondly, if the collective effort of ASEAN countries in promoting the harmonisation of national cyberlaws proves successful, it would serve as an interesting example for the governance of ICTs in general and the Internet in particular at a regional or transnational level. To be sure, the simple fact that cyberspace does not have due respect for national and geographical borders is a major challenge for not only ASEAN countries but also the rest of the world in terms of governance.

The growing consensus in the public debate over the need for working towards a transnational or regional level of ICT governance leads to an interesting dimension for future research. The ASEAN Secretariat highlighted two specific issues that governments in the region need to address in order to implement the e-ASEAN initiative: jurisdiction and taxation (ASEAN Secretariat, 2001). Regarding jurisdiction, the harmonisation of cyberlaws through the e-ASEAN initiative cannot by-pass controversial questions such as, among others, which national law to be used in resolving transnational e-commerce disputes and whether court judgement reached in one country could be enforced in another. The issue of e-commerce taxation is equally challenging: whose taxation regime should be used and to which state should taxes be paid when an e-commerce transaction occurred in more than one country and conducted in an "e-space," where there are no clearly defined national borders?

Outside ASEAN, the only comparable model of ICT regulation at a regional level is provided by the European Union (EU), where a regulatory framework for electronic communications has been adopted by member states. It would be worthwhile to undertake further research to compare and contrast the eASEAN model of cyberlaw harmonisation with the European model of communications regulation. A comparative study of this kind could shed light on the issue of whether regional or transnational level governance for ICTs is a desirable and practical solution to the challenges posed by the information age to the nation state at the national level in terms of governance and regulation.

## CONCLUSION

The launch of the e-ASEAN initiative represents one of the most significant attempts at the regional level by a group of nation states to collectively explore the potential benefits that the global communications revolution brings with it. The main objective of the e-ASEAN initiative is to promote regional economic development and regional cooperation by effectively fostering an "e-space" within the region.

While it is not inconceivable that new ICTs in general, and the Internet in particular, could help overcome many traditional barriers, such as national boundaries and geographical distance, that hinder transnational cooperation, the same technologies poses a number of challenges to ASEAN political leaders. Firstly, before the intra-regional digital divide is effectively closed, many individuals and some parts of the ASEAN region will remain excluded from the digital revolution. This begs the question of who and which countries are going to benefit most from the e-ASEAN initiative. Secondly, cyberlaw harmonisation, one of the stated missions of the e-ASEAN initiative, is faced with a reality in which not all member states have passed legislations regarding cyberspace and those states with cyberlaws in place have their distinctive national approaches. It will be a daunting task to achieve a consensus over the governance and regulation

of cyberspace at the regional level in ASEAN. Finally, some member states in ASEAN are torn between pursuing their national ICT agenda and the common e-ASEAN agenda. The fact that both Singapore and Malaysia wish to become a regional ICT hub has added a competitive feature to the emerging "e-space" in ASEAN, which goes against the key word of the e-ASEAN Framework Agreement—'cooperation!'

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## KEY TERMS

**ASEAN:** The Association of Southeast Asian Nations (ASEAN), representing a key regional trading block in the world, was established following the signing of the ASEAN Declaration on August 8, 1967 in Bangkok with five founding member states, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei became the sixth member in January 1984. This was followed by the CLMV (Cambodia, Laos, Myanmar, and Vietnam) to join ASEAN in the 1990s. The main objectives of ASEAN include: (i) accelerating regional economic growth, social progress, and cultural development and (ii) promoting regional peace and stability. The 10 member states have a total population of about 500 million, covering a total area of 4.5 million square kilometres.

**Cyberspace:** A virtual or notional environment of electronic communications. The online environment facilitated by the Internet is the most popular type of cyberspace.

**Digital Divide:** Digital divide refers to the disparity in opportunities and abilities for making use of information and communications technologies that exists between different social groups and between different countries in the digital age.

**e-ASEAN:** Originally initiated by the ASEAN economic ministers in September 1999 and endorsed by ASEAN leaders at their summit in Manila in November the same year, e-ASEAN aims to develop an ASEAN "e-space." The e-ASEAN Framework Agreement, signed by the ASEAN member states at the Fourth ASEAN Informal Summit in November 2000 in Singapore, serves as the legal foundation for the e-ASEAN initiative.

**E-Commerce:** E-commerce refers to online electronic transactions involving the sale and purchase of physical goods or digital goods (e.g., software, digital films, and music, value added information in electronic format).

**Information and Communications Technology (ICT):** Information and Communications Technology (ICT), as defined in the e-ASEAN Framework Agreement, refers to "infrastructure, hardware, and software systems, needed to capture, process, and disseminate information to generate information-based products and services" (ASEAN, 2000, Article 1a).

**Multimedia Super Corridor (MSC):** Launched by the former Prime Minister Dr Mahatir in 1997 and remained as his pet project until his retirement, the Multimedia Super Corridor initiative (MSC) includes the creation of an ICT business and technology centre (Cyberjaya) to attract foreign direct investment (FDI); an "intelligent city" as the new federal government administrative centre (Putrajaya); a new international airport (i.e., the Kuala Lumpur International Airport (KLIA) and the Kuala Lumpur City Centre (KLCC)). The four "hot spots" are digitally linked through a fiber optic cable infrastructure offering high speed communications and a new motor way network. The MSC stretches over a designated development area of 50 kilometers long and 15 kilometers wide.

# E–Auctioning by The U.S. Federal Communications Commission

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## INTRODUCTION

Market economies rest on a foundation of the private ownership of resources. Certain resources, however, have been managed outside of the market mechanism, even in the United States' decidedly pro-free-market economy. The management of radio frequencies, or spectrum, is a prime example of government control of a valuable resource. Spectrum management is practiced by governments around the globe, and the experience of the U.S. Federal Communications Commission (FCC) provides a valuable illustration of how management of this resource may be improved through the use of electronic resources.

## BACKGROUND

The portion of the electromagnetic spectrum consisting of the frequencies ranging from 3 kilohertz (KHz) to 300 gigahertz (GHz), commonly known as radio frequencies, represents a natural resource that may be exploited through technological means. When considered in the context of other naturally occurring resources, radio frequencies are unique. On a geographic basis, radio frequencies are limited but are uniformly distributed. As long as the strength of the radio signal is controlled, the same amount of radio frequency is available per square mile in the U.S., Uganda, or any other nation. Each nation must live with what is available within its borders; the import and export of radio frequencies is not possible. While the resource is limited, it is continuously renewable—each frequency becomes available again at each new moment in time.

In addition to the geographically limited nature of the resource, various portions of the radio-frequency spectrum have properties that affect their usefulness. As the frequency of a radio wave increases, the wavelength decreases. Smaller wavelengths have a higher likelihood of being deflected by physical objects such as buildings, foliage, or even water droplets in the atmosphere in the form of rain, snow, or fog. Longer wavelengths easily can penetrate objects. These differences in the physical properties of spectrum make certain frequency ranges more useful (and more valuable) than others. The differences in the quality of spectrum place further impetus for management of the resource. By matching the performance needs of a technology with a spectrum range, the resource can be used more effectively. For example, broadcast radio, which may encounter significant environmental barriers associated with mobile receiving units (in automobiles) or stationary receiving units (inside dwellings) benefits from the use of relatively longer wavelengths associated with the AM and FM frequency bands. On the other hand, satellite-to-earth transmission can rely on a fixed ground station antenna that can be oriented skyward to avoid physical barriers such as walls and trees and, thus, can perform well with relatively shorter wavelengths associated with higher frequencies.

Concerns regarding interference between competing users of spectrum have been the prime motivation for strict control of most of radio-frequency resources (Noam, 1998). Analog technologies, which were associated with early radio-frequency applications, suffered functional degradation if they were not guaranteed the exclusive use of a specific radio frequency. Thus, management of radio frequencies by the FCC and other governmental bodies around the globe traditionally are based on an approach that systematically organizes the spectrum resource into logical groupings and then assigns exclusive rights to use the spectrum to certain individuals or organizations.

## U.S. POLICY AND SPECTRUM MANAGEMENT

In order ro facilitate the management of spectrum in the U.S., the entire range of radio frequencies is divided into bands or blocks that are associated with specific applications or technologies, such as broadcast television or cellular telephones. These divisions are known as allocations. Within the allocation of radio frequency, the bands face further subdivision, known as allotments. Allotments are associated with a specific geographic area; for example, a specific frequency to be used as a television channel in a specific metropolitan area or a frequency to be used by cellular telephone companies in a rural area. With these divisions, the spectrum then may be assigned,

or licensed. The grant of a license gives the user the ability to provide the specified service in the geographic area and may impose additional conditions on the use of the radio frequencies, including the type of technology (analog vs. digital) and the strength of the signal.

## Assigning Spectrum in the U.S.

While economists have advocated private property rights for spectrum for years (Coase, 1965), U.S. law prohibits private ownership of spectrum (Shelanski & Huber, 1998). Thus, administrative means were traditionally used to manage the resource (FCC, 1997b). Applications that had the most significant potential to suffer from interference degradation, such as broadcast radio and television, required significant capital investments, which led to relatively little competition for the required spectrum resource. In geographic areas where the economics of the market was substantial enough to lead to higher demand for the resource, comparative hearings were used to determine which of the competing entities would be eligible to receive an exclusive license. In a comparative hearing, the competing interests (typically a broadcast radio or television station) would present their cases before an administrative law judge, who ultimately decide whether the public interest would be better served by one or the other of the competing interests.

## Impact of Cellular Technology

With technological change, significant difficulties emerged with the then-existing approach to spectrum management. While radiotelephones were commercialized in the 1950s, the development of analog cellular telephone technology during the 1970s offered the potential for a much broader dissemination of wireless telephony. By carefully limiting signal strength, a limited amount of spectrum could be reused in multiple adjacent cell sites. While the previous radiotelephone service might enable 40 to 50 simultaneous calls in a metropolitan area, the new cellular technology potentially enabled thousands of simultaneous calls, which generated the possibility of a much larger subscriber base (Rappaport, 2002). The new technology required that spectrum be licensed to companies that essentially would resell use of the radio frequency to the public, which the FCC deemed Commercial Mobile Radio Service (CMRS). Underlying the distribution of spectrum for the initial cellular telephone technology was a policy of duopoly. In each geographic area, only two licenses would be granted, with one offered first to the local telephone company serving the geographic area and the second available to other businesses. The limited availability of licenses combined with the commercial potential of the new service led to high levels of demand for available licenses. As a result, the FCC was confronted with a new problem with the allocation of spectrum resources. Multiple competing interests were interested in the limited number of licenses, with 200 applicants vying for the first 30 licenses made available (FCC, 1997b). Comparative hearings were the only means by which the FCC could settle the issue of which of the limited number of licenses should go to whom. Complicating the comparative hearing process was the similarity of the applicants. As a result, the administrative process was faced with numerous situations that, for all practical purposes, were ties between competing interests. The inefficiency of the comparative hearing process led to significant delays in the distribution of the initial cellular licenses.

Following the problems associated with the distribution of spectrum licenses through comparative hearing, the FCC sought authority for an alternative mechanism—lotteries. Given the prevalence of ties in the qualifications of those seeking licenses, the theory of the FCC lottery scheme was based on random selection from a qualified pool of interested parties. With the winner picked randomly, ties would be broken, and the speed of distribution would be promoted. However, the process of qualifying lottery participants also introduced delays, with the first prequalifications taking about two years. To remedy this situation, the FCC sought further authority from the U.S. Congress to eliminate the need for prequalification. With prequalification eliminated, lottery participants quickly obtained licenses, but now another set of problems emerged. As the public became aware of the value of the resource that was being given away through the lottery process, large numbers of individuals sought to participate in the lotteries. Given the pre-Internet period, the paperwork required by the FCC to participate in a lottery presented a hurdle for those uninitiated in the operations of U.S. federal government agencies. Thus, third-party businesses, which came to be known as license mills, emerged. The license mills would process and submit the necessary paperwork for participation in a lottery. This rent-seeking activity resulted in hundreds of millions of dollars of revenue for the license mills (Hazlett & Michaels, 1993).

While the rent-seeking activity associated with the license mills was socially wasteful, further problems emerged after the licenses were awarded. Licenses were awarded relatively quickly; however, the licenses were not put to immediate use. Rather, a secondary market for licenses emerged, resulting in windfall profits for license holders. Delays once again were introduced into the process of distributing licenses while lottery winners sought the highest bidder for their licenses.

The problems associated with the distribution of spectrum licenses led the FCC to approach Congress again to

revise the method by which licenses could be granted for spectrum, resulting in the establishment of the FCC's electronic auctions.

## AUCTIONS

Auction authority was granted to the FCC as part of the Omnibus Budget Reconciliation Act of 1993. The auction authority that was granted to the FCC was quite limited. The interests of broadcasters and other entities who already utilized spectrum resources without charge were protected by the law. The authority granted to the FCC limited the auction process to spectrum that was to be newly transferred from governmental use to non-governmental use and that also was to be used by the licensee to generate revenues from subscribers for transmitting and receiving signals over the licensed spectrum (47 USC, §309(j)(9) and §309(j)(2)(A)).

The newly available spectrum ultimately was used to enable a variety of new services, including digital cellular services (Personal Communications Services [PCS]), fixed high-speed data services (LMDS), direct broadcast satellite service (DBS), and paging services (FCC, 1997b). The legislation required that the FCC take a flexible approach to determine the best bidding method for the spectrum resource.

*Figure 1. How an FCC auction is initiated (FCC Wireless Bureau Web site)*

**How is an FCC Auction Initiated?**

1. Comment Public Notice
(Approximately four to six months prior to auction)
A public notice is released seeking comment on auction procedures.

2. Procedures Public Notice
(Approximately three to five months prior to auction)
A public notice is released providing potential participants with the procedures, terms, and conditions for the auction event.

3. Seminar
(Approximately 45 days prior to auction)
A free pre-auction seminar is conducted for potential participants in order to introduce them to the auction rules and process. The bidding software is demonstrated.

4. Short-Form (FCC Form 175) Application Filing Deadline
(Approximately 30 days prior to auction)
Form 175 application, which must be filed electronically, collects basic information about the applicant.

5. Filing Status Public Notice
(Approximately one week after the filing deadline)
After the deadline for filing, the FCC reviews all timely filed short-form applications and deems them accepted, incomplete, or rejected. The status of the applications is communicated to the public through the release of this public notice.

6. Upfront Payment Deadline
(Approximately two weeks prior to auction)
Potential bidders must submit a refundable deposit, which is used to purchase the bidding units required to place bids in the auction.

7. Short-Form Application Resubmission Deadline
(Approximately two weeks prior to auction)
Form 175 applications that were deemed incomplete must be refiled by this deadline, which often coincides with the upfront payment deadline.

8. Qualified Bidders Public Notice
(Approximately 10 to 12 days prior to auction)
This public notice lists the bidders qualified to participate in the auction.

9. Qualified Bidders Registration
Immediately following the release of the Qualified Bidders Public Notice, the bidder registration process begins.

10. Mock Auction
(Approximately two to three days prior to auction)
To ensure that bidders understand the auction process, the FCC sponsors a mock auction as a service to the qualified bidders. The mock auction allows bidders to work with the bidding system, become comfortable with the rules and conduct of the auction, and familiarize themselves with the telephonic bidding process.

11. Auction Begins

## Designing an Efficient Auction

Every market transaction is based on information. The price at which an object is bought and sold depends on the information available to the buyer and to the seller. With regard to the newly available spectrum that the FCC was charged with selling, there was a distinct asymmetry of information between the seller (the FCC) and potential buyers (companies interested in providing wireless services). Obviously, the FCC wanted to generate the highest level of revenues possible from the sale of spectrum rights, while the buyers wanted to pay as little as possible. Thus, designing an auction structure that resulted in the highest level of revenues was a priority for the FCC.

Spectrum rights have an interesting economic characteristic. Unlike an object of art or a piece of sports memorabilia, which may have a unique personal value to the purchaser, spectrum rights are likely to provide a similar value to any purchaser. This situation is known in the economics of information as common values (Baye, 2000). For example, suppose that the FCC were to auction five new licenses to provide a new digital wireless service to the Boston, Massachusetts, market area. Because the service is new, *ex ante*, no firm knows the exact value of these licenses. To any firm winning a license, however, it is likely that the profits associated from providing the service will be similar. In formulating a bidding strategy for a license, each bidder estimates the costs and revenues expected if the license were to be won. Once this calculation is completed, the bidder has an estimate of the highest bid that they would possibly be willing to make. While it is likely that the various bidders would come up with similar valuations of the licenses, it is unlikely that the valuations would be identical. There would be some variation in the valuations.

This situation results in a potential risk to any prospective buyer. If common values are present, then the high bidder in any auction is likely to be the party that has experienced a random variation in calculating the expected value of the license on the high side (i.e., the winner likely will pay too much for the object). This outcome has been dubbed the winner's curse. Of course, potential bidders are aware of the winner's curse; thus, rational bidders will follow a bidding strategy that leads them to shave their bid (i.e., to not bid as much as they think the object is actually worth). From the seller's perspective, the winner's curse will lead to lower auction revenues, as buyers will not be willing to bid up to their true valuation of the object. Thus, the FCC was interested in developing an auction format that would mitigate the impact of the winner's curse.

Compounding the FCC's auction design problem was the complexity of the objects to be auctioned. Policy objectives of promoting competition in the provision of wireless services and also promoting small-business participation in the auction process resulted in the creation of numerous market areas. For the PCS auctions, a total of 493 market areas (known as basic trading areas) were used, and multiple licenses were available within each Basic Trading Area. This led to the availability of more than 2,500 licenses for 10-year terms (Bykowsky, Cull, & Ledyard, 2000). Thus, a potential bidder would be very concerned about the complementary and substitute relationships of licenses and would be faced with a complex and risky environment.

## Electronic Simultaneous Multiple-Round Auctions

In order to solve these problems, the FCC developed electronic auctions, which allow users to participate over the Internet or by telephone. All licenses are made available for bidding during the entire auction period, which creates the simultaneous nature of the auctions. The auction is conducted in rounds, each having a set duration. At the end of each round, the bids are posted on a Web site for review by the bidders. This format allows bidders to evaluate the bids placed by other participants.

While the duration of rounds is established by the FCC, the number of rounds are not. Bidding is allowed to continue until all bidder activity ceases. When this occurs, the auction is closed.

The FCC's approach also allows bidders to place combinatorial (package bids) in which the bidder can place bids on groups of licenses. Package bidding is particularly important where complementary relationships between licenses exist. For example, a firm that is planning on offering service on a regional basis might want to purchase licenses in two or three basic trading areas. With the package bidding approach, a firm could place bids on the entire group of licenses in which it was interested. Package bidding will tend to increase auction revenues, since it encourages bidders to reveal their perceptions on the values of groups of licenses.

## Look and Feel of the Auction Web Interface

The auction interface requires qualified bidders to log in, and then it presents menus of information, including public notices associated with the specific auction, pages where bidding histories can be reviewed, and pages where bids can be placed. Several screen shots from the FCC's auction Web interface have been provided in the appendix.

## FCC Auction Structure and the Winner's Curse

Recall that the winner's curse is related to the bidder's lack of information. When formulating their bidding strategies in isolation, bidders will be reluctant to place bids up to their estimate of their true values. While prohibiting collusion, the FCC's auction structure offers an opportunity for bidders to exchange information by viewing all of the bids that are placed in each round. For example, if a potential bidder, when formulating its bidding strategy, calculates a value of $500,000 for a specific license, and after two or three rounds of the auction, the high bids observed are significantly lower than $500,000, then the bidder might want to reevaluate the analysis underlying its bid. Perhaps it made a mistake or overlooked something in the development of its valuation.

## FCC AUCTION OUTCOMES

As of early 2005, the FCC had conducted 55 auctions, which generated about $44 billion in revenues, all of which have not been collected. The results of the auction process have overcome some of the difficulties associated with the granting of spectrum licenses through administrative hearings and through lotteries. Auctions generally have delivered the spectrum into the hands of those who can put it to use quickly (FCC, 1997b), and the auction process has a tiebreaker, as there can be only one winning bidder per license.

## PROBLEMS WITH FCC AUCTIONS

As was discussed earlier, the auction approach utilized by the FCC encourages the sharing of information through the public availability of bidding information. Auction participants, however, are not allowed to exchange information privately, to stake out claims to certain licenses, or otherwise to collude (FCC, 2003). However, auction participants have been found to signal one another regarding their intentions by incorporating desired basic trading area numbers into their bid values (Cramton & Schwartz, 2000), a practice that the FCC now carefully monitors (FCC, 1997a). The biggest problems associated with the FCC's auction process have not been a result of the auction process itself but relate instead to separate policy mandates regarding small business participation in the auction process. Some have pointed to the general inefficiency of these set aside programs (Hazlett & Boliek, 1999), but the ultimate problem that emerged from the small business set-asides resulted in the authority to manage spectrum being partially wrestled from the FCC.

In order to accommodate the more limited financial capability of smaller-scale bidders, the FCC auction rules allowed winning bidders to pay off their winning bids on an installment plan. Following the completion of these so-called entrepreneur block auctions, several winning bidders encountered financial difficulties, and some filed for bankruptcy protection prior to paying off their installments. A pressing question that then needed to be answered was how the licenses of a bankrupt bidder would be disposed. The FCC thought that they should be returned so they could be auctioned off again. However, the jurisdiction of federal bankruptcy courts was now involved, and a process of judicial review that led to the U.S. Supreme Court was undertaken. Ironically, the Supreme Court ruled in favor of the license holders, which allowed the licenses to be treated as an asset of the bankrupt bidders. The result of these bankruptcies has been to reduce collections of auction revenues (CBO, 2002). It also removed the FCC from the process of controlling the distribution of these licenses.

## FUTURE TRENDS

Despite the problems encountered to date, the FCC auction process generally is viewed as a success (Cramton, 1998, Hazlett, 1998), but there are dissenters (Morris, 2004). The structure of the FCC's auctions have been adopted by other nations following problematic outcomes with other formats (Anadalingam, 2001). Some non-U.S. auction formats have been viewed as successful (Crandall, 1998). Licenses for third-generation wireless services have been auctioned throughout Europe (Anderson, 2002). While there is no question that auctions are superior to other methods for generating revenues, whether they promote good spectrum management policy is an issue of concern. Spectrum licenses are founded on the assumption that the services utilizing the spectrum will suffer from interference. New technologies, such as digital spread spectrum, utilize intelligent devices, which are capable of coping better with interference. Some have suggested that the future of spectrum management will not require much management due to these new technologies (Noam, 1998). A major impediment to the advancement of these new technologies may be the existing licensing of spectrum, which leaves little room for the deployment of these new technologies (GAO, 2004). Of course, economists point to the superiority of property rights in spectrum (Hazlett, 2005); thus, it likely will be some time before the dust settles on the long-term need to license spectrum and to use auctions for that purpose.

## CONCLUSION

Auctioning spectrum licenses is a major innovation in the governmental management of natural resources. The complexity of the economic process has been mitigated significantly due to the use of electronic resources. The ability to conduct simultaneous multiple-round auctions would have been limited significantly absent electronic means to process and distribute information in real time. Electronic spectrum auctions, as conducted by the FCC, have provided valuable lessons in the application of electronic technology to achieve policy objectives.

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## KEY TERMS

**Allocations of Spectrum:** The categorization and division of spectrum into blocks that are then associated with a specific technology; for example, broadcast television.

**Allotments of Spectrum:** Divisions of spectrum allocations on a geographic basis; for example, broadcast television station 5 in New York City.

**Basic Trading Area:** A geographic region used by the FCC determines service areas for PCS wireless licenses. The entire U.S. and some of its territories are divided into 493 non-overlapping BTAs.

**Combinatorial Bidding:** Allowing auction participants to place bids on groups of licenses.

**Comparative Hearings:** Method used in the U.S. to award spectrum prior to the advent of cellular telephones.

**Hertz:** The number of cycles per second.

**License:** The right to use a specific portion of the radio frequency in a specific area for a set term.

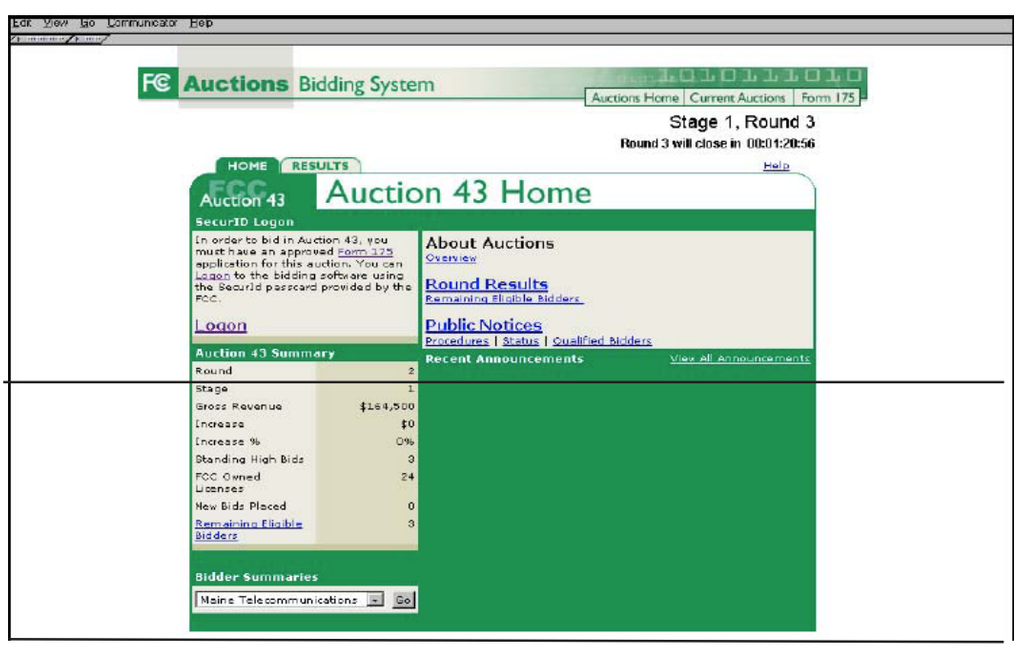
**Radio Frequencies:** The portion of the electromagnetic spectrum ranging from 3 kilohertz (kHz) to 300 gigahertz (300 GHz).

**Simultaneous Multiple-Round Auction:** An auction process in which all licenses are available for bid at the same time.

**Spectrum:** Radio frequencies.

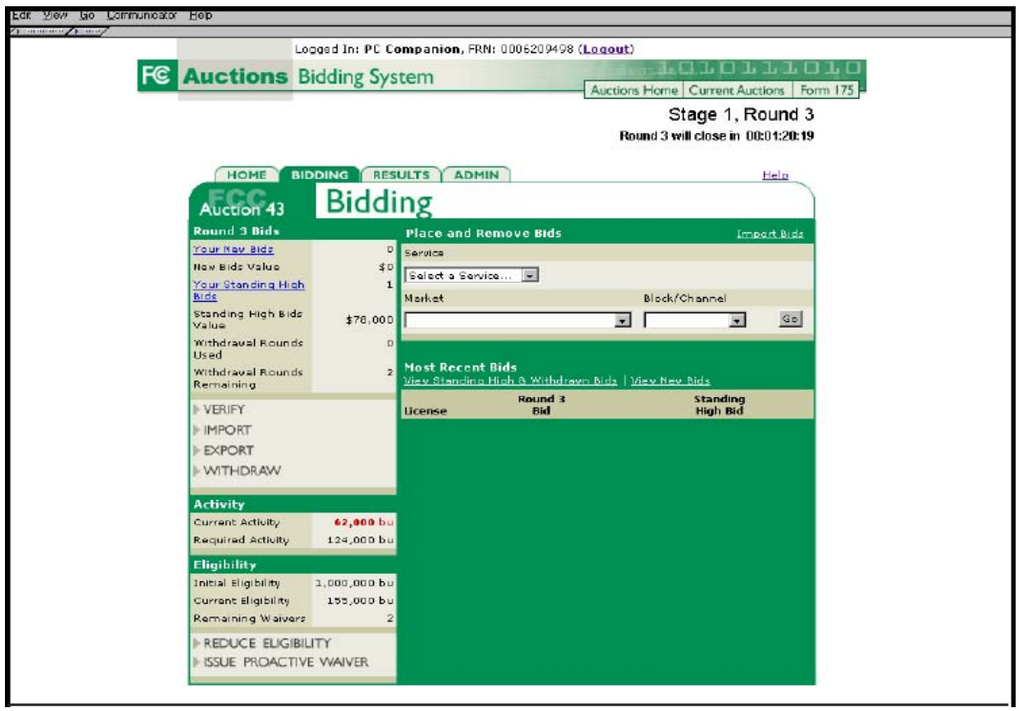
**Winner's Curse:** Tendency in common value auctions for the high bidder that wins due to variation in the formulation of a bid on the high side.

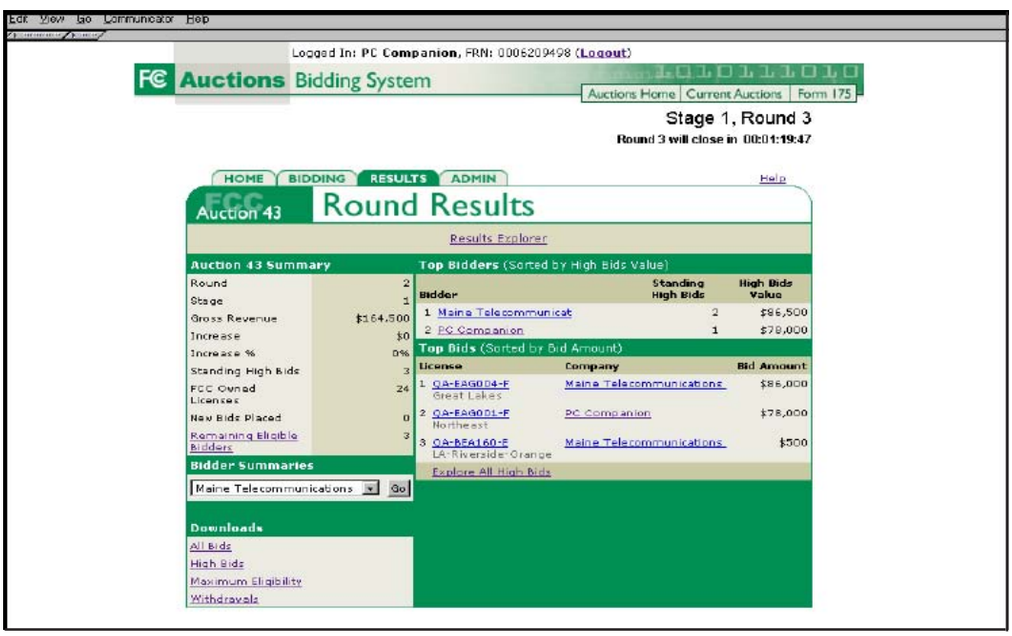
## APPENDIX A



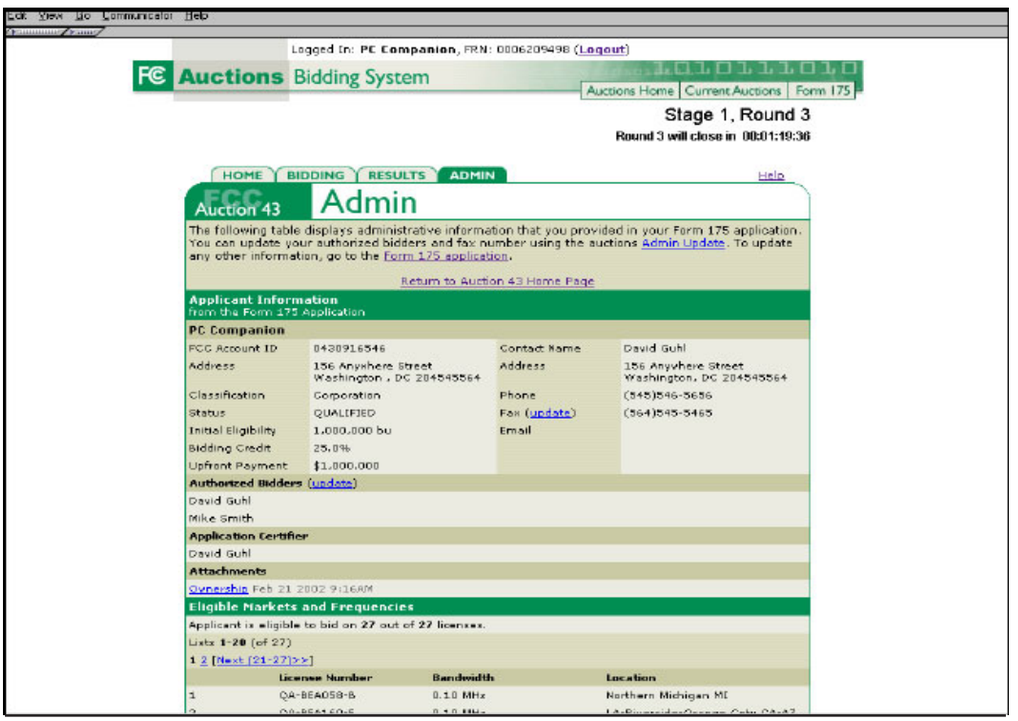
## APPENDIX A, CONT.

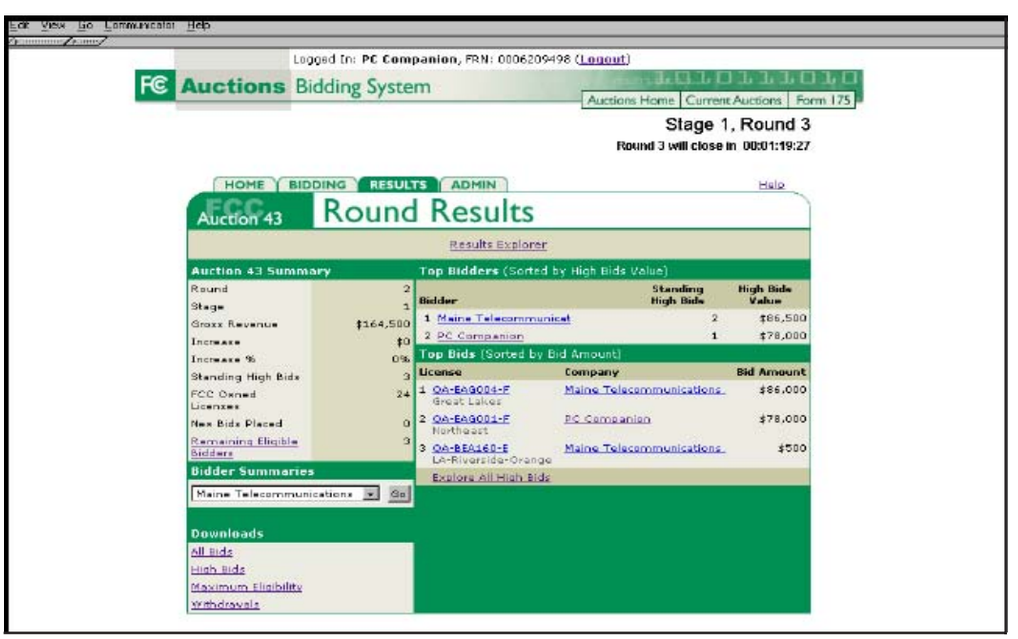




## APPENDIX A, CONT.



# Ecology of E-Governance



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## INTRODUCTION

The concept of e-governance in the modern times refocuses on the fundamental role of government as the institution of transformation of society. To understand the intricacies of e- governance it will be pertinent to examine the concept from an ecological perspective. The system of governance in order to meet the challenges must equip itself with the mechanisms of managing the pressures generated from different subsystems. The interrelationship and interdependence of these subsystems explain the operational reality of bureaucratic systems in relation to societal transformation. In last few decades, the history of humankind has seen the enormous growth of technology and its utilization for creating a better global society, by disseminating the knowledge down to common person and transcending the geographical boundaries. The accessibility of knowledge is not confined to any nation. Thus, the whole world has to acquire a bigger vision of coexistence with divergent societal patterns in future, because it is the source of developing shared visions. The present analysis focuses on the normative aspects of e-connectivity, specifically,

1. It proposes a conceptual framework to understand the futuristic operational dynamics of ecology of e-governance;
2. It proposes how the interactions of various components of e-governance, can help in evolving a universal society with ethical axis to create a better world;
3. It suggests that the whole world eventually has to move in the direction of evolving a global society by inculcating universal values of coexistence with divergent ethos. Hence, the need to transform the society cannot be subdued; and
4. It focuses on striving a balance between technological and human aspects by bringing out philosophical core at the centre to evolve global society.

## BACKGROUND

The era of information technology has opened many vistas of understanding human dynamics from different perspectives. The thinkers have shown a great concern to view the repercussions of electronic connectivity on society, culture, polity, and economy. To name a few, for instance, Daniel Bell explores the dimension of knowledge and technology in relation to the emergence of the new class structure of postindustrial society (Bell, 1996). Manuel Castells has discussed the formation of Network Society, which elaborates the economic, social, and cultural changes that are occurring around the world due to computerization (Castells, 1996, 1997, 1998). An interesting aspect related to changing relationship is also examined by Mark Poster, who is keen on constructing correlation of human-machine imbrications due to exposition of communication machines (Poster, 2000). Raising the question of evolving alternative theories, Frank Webster questions the technological determinism by evolving the theories of Information Society looking closely at the different approaches to informational development (Webster, 2002). Maintaining the continuity of the discussion, futuristic social transformations can also be viewed from ecological perspective. This needs identifying various components of e-governance and interplay to shape future society with universal areas of normative structuring.

## ECOLOGICAL PERSPECTIVE OF E-GOVERNANCE

The concept of ecology in governances refers to the understanding of the interrelationship and interdependence of bureaucracy with its environment. To understand its ecology, it would be pertinent to identify various components, substantiated by elaborations regarding how these components interact with each other to deliver the output in to society: (1) technological component focuses on electronic dimension, (2) social component focuses on egalitarian dimension, (3) cultural component focuses on ethical dimension, (4) political component focuses on enactment dimension, (5) psychological component focuses on extensional dimension, (6) service component focuses on empowerment dimension, (7) administrative component focuses on enforcement dimension.

The "E" in the aforementioned dimensions emphasizes the role that can be played by e-connectivity that metamorphoses into respective components.

- **Technological Component:** This relates to educating people who are in the bureaucracy or outside its periphery regarding the use of electronic means to develop better connectivity within and with the system. It requires use of technology (a) in developing the database, (b) in networking to facilitate the communication, and (c) in creating e-knowledge workers to increase the potentiality. This focuses on the "e" of electronic knowledge and its proper utilization.
- **Social Component:** The fundamental duty of any government is to educe a society, based on the principles of equality and justice. A society, which is classless having no distinction between haves and have-nots, where nobody is marginalized from the main stream, and is committed to provide a respectful essence of life to its people without any discrimination of caste or race, must be set up. This is possible only when people are aware of their rights and duties on the one hand, and know about the governmental policies made for them on related issues on the other, hence a vigilant society can be evolved where they can raise their voices by questioning the governmental decisions. This would help in attaining the "e" of egalitarian society with thrust on equality.
- **Cultural Component:** With the advent of the era of knowledge explosion there is a need to reorient some of the value patterns without eroding the fundamental normative structure of any social system. The need to create value patterns conducive for e-governance to operate focusing on work ethos therefore cannot be denied. Thus to work out the ethical framework is the key to move further by discarding obsolete sets of values that come in the way of potential utilization. Thus, "e" of ethical framework has to be the focal point in constructing a morality-based system.
- **Political Component:** The political system is essential aspect of governance. It holds responsibility of rationalizing various operative frameworks by enacting laws. This helps to maintain and sustain the cohesive force that is required by society to integrate its people and abide them to follow a uniform policy to fulfill their targets. This refers to the importance of "e" of enactment of laws to stop society from disintegration.
- **Psychological Component:** Evolving balanced society requires psyche to facilitate formation and inculcation of right type of attitudes in the people. It is prerequisite for efficiency. Apart from this, readiness to connect to people, to listen to their queries, to look for solutions, to improve communicative skills, and so forth, will be necessary elements for behavioral modifications. Hence, personality adjustments must be carried out to cater to the needs of common people. This specifically relates to "e" of extension of self to have constructive collaborative social relationships.
- **Service Component:** The ultimate function of any welfare government is to serve. As a provider of good services to its people, it has to assimilate the basic needs and expectations of common person in to the documentation of policy, which then has to be implemented in the right spirit. This develops a constant pressure on the government to respond to public demands as this leads to the realization of power they can exercise on government to maintain impartiality, integrity and transparency in its functioning. This explains "e" of empowerment of people in any system.
- **Administrative Component:** Administrative component is inevitable because it is through this component that policies are translated into action. How to enforce decisions effectively need to be worked out keeping in view, the modifications and adaptations required. Thus, a responsive system can only be there when system is open to respond to the changes, this explains the "e" of enforcement of carrying out its decisions.

To get an insight into the mechanism of functioning of various components there is a need to identify at least two parameters each, so that variations can be measured and recycled into society.

- Political parameters
  1. Identifying areas for which integrated cyber laws are needed
  2. The contents of laws
- Administrative parameters
  1. Evolving unified machinery connected with networks
  2. Registering and solving people centered problems
- Social parameters
  1. Ensuring people's participation in governmental policies
  2. Enlarging the domains of making choices by people.
- Cultural parameters
  1. Designing universal value systems and
  2. Inculcating the designed values at various levels of operations.
- Psychological parameter
  1. Restructuring the attitudes of individuals and
  2. Readiness to connect to people

- Empowering parameter
  1. Awareness about the rights and duties and
  2. Knowing how to get benefited by these rights
- Technological Parameters
  1. Increasing the potential of every individual as knowledge worker and
  2. Catalyzing the usage of his knowledge for transformations

## PROGNOSTIC REALISM: A FUTURE VISION

The prognostic realism involves identifying attributes of parameters of components from individual society to society in the logical manner that leads to the formation of idealistic global society. The "transformation" as positive notion indicates capacity of a system to resolve inherent conflicts and fight back the situations of crisis. To create such society the world has to work out broader vision of constructive collaborations, because once we have vision, it can be converted in to reality. We therefore must identify various attributes of components.

### The Attributes of Various Parameters of Components

Looking to future reality the quantitative attributes of these parameters will always be putting demands on subsystems to combine in right combination to cater to the needs of continuous change. Assuming development is desirable and planned change, and will remain so in future the following attributes of different components can be identified.

- Political com
  1. Number of cyber laws enacted and amended
  2. Percentage of votes in favor/in opposition
- Administrative com
  1. Number of laws implemented
  2. Number of innovations carried out
- Social com
  1. Number of effective choices made available
  2. Amount of participation mobilized for policy
- Cultural com
  1. Identifying obsolete value patterns
  2. Level of perceptions for newer patterns
- Psychological com
  1. Amount of resistance reduced for implementing policies
  2. Amount of behavioral adjustments made
- Service com
  1. Degree of transparency of policies
  2. Degree of awareness achieved.

Qualitatively this means content with which laws/programme/policies are made. The integrity is an important aspect for facilitating creation of better world through e-governance. In addition, a genuine commitment to get the consequential outcome of developing an ideal society by using various inputs of e-governance to redesign the world over systems into more closely connected system of functioning together is needed.

What lies in future is unknown, but if we can design logically and systematically, perhaps a better future can be created. Thus there is a need to evolve a philosophical core that might help us in understanding what shape might emerge of the society if the entire world is governed by e-governance, which will be a trajectory of today's society for future.

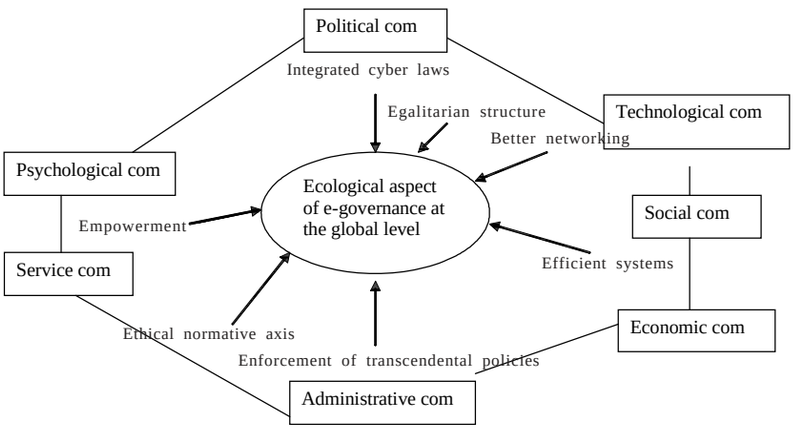
The assumptions would be as follows:

1. If various governments are connected electronically then there is shrinkage of distances hence arises the need of having congregated society.
2. If we move toward a congregated society, then normative axis has to be designed, hence arises the need of inoculating universal values.
3. If universal set of values has to be designed then geographically tightened sets of values have to be defied, hence arises the need of identifying and accumulating divergent sets of value patterns.
4. If we accept the coexistence of divergent values then collaborative identities can be evolved hence arises a need to have a closer look at the types of worldwide societal patterns.
5. If ethical core of future society revolving around virtuous values is to be created then there is a need to examine all other systemic variables that might shape the polity and economy in the direction of evolving a highly contended mega-social structure.
6. If future indicates the formation of mega-social structure, then there is a need to understand ecology of e-governance, thereby focusing on strategically designed components.

This mega-society can be viewed as the resultant outcome of interaction of various components of e-governance, which will require the following parameters to have permutations to see that how interactions of various components must be planned conceptually to visualize the future transformations.

For transforming the future, various polities will have to work in a more coordinated way by resolving issues

*Figure 1. Interplay of various components*




related to discrimination and disparity at various levels through conscious efforts by evolving mechanism of futuristic social engineering, following:

1. A careful exercise on prognosis mentioned
2. The appropriate mixing of quantitative attributes of different parameters
3. A construction of desirable design of future operational reality, focusing on professionalism, idealism, philosophy, and realism.

The key to shaping the future lies in idealizations of what type of system we want to evolve. The human-created structures can never become perfect structures of functioning, but by keeping high ideals, molding can be one alternative to strive for seemingly difficult targets. This relates to highlighting what possible efforts must be taken to convert ideals into reality.

## The Operational Designing

It requires:

1. Defining resultant activity of social transformation
2. Managing input-output inflow of components
3. Managing the environmental forces
4. Evolving knowledge-based global society
5. Achieving the objective of social transformation by assimilating the above-stated functions.

A concrete statement about future vision must be spelled out so that it will help us to visualize those prerequisites for changes without which no transformation can occur. Web connectivity must be used for facilitating peaceful coexistences by mobilizing the population to contribute in generating positive and virtuous environment. To explore the practical possibilities it would be pertinent to understand how does ecology help to manage the input–output inflow of components in achieving the objectives of social transformation. Attributes identified must be carefully internalized to support the formation of ideal global society. This can be understood by looking at the Figure 1 to visualize the interplay of components with probable outcomes.

## Strategic Interventions

The scientific and humanistic explorations will be the two important epicenters of future activities. The challenging task would be to reduce the extraneous effects by controlling the negative impacts. In this regard, e-connectivity can help in perpetuating the stronger and eternal principles of existence that will take us to the evolved state of human existence by providing the better mechanics of managing conflicts at different levels. The value structuring is important for the creation of global society. This can be done by polarizing various sets of values as per the need along the major normative axis.

Three sets of values can be identified:

1. Blokades values which are detrimental for transformation
2. Plasmatic values, modified version of term plasma taken from science which refers to free flow of particles. The analogy here is that in society we also have some sets which can generate positive energy. Thus they must be recycled.
3. Axial values which are fundamental values, conformity to which is essential for any particular society

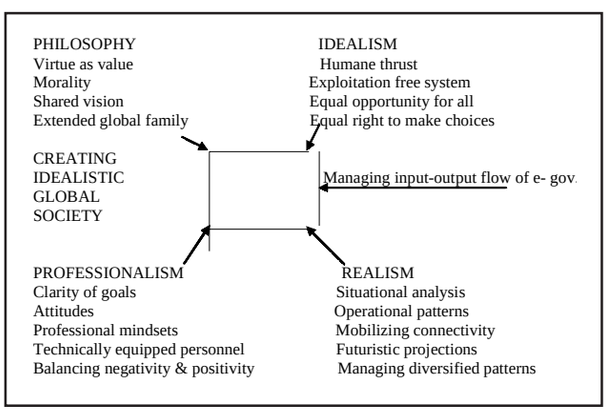
The formation of universal values must be inoculated to evolve global society in the following way:

- Initiating discussion regarding the type of global society we are looking for
- Arriving at the consensus regarding design of values that is needed
- Reshaping the various socio-economic, political, cultural subsystems, keeping in mind their alignment with global society. Keeping in mind the operational design and vision as mentioned above, systems have to be molded to get the desirable transformations. The central focus of the transformation is creating global society that combines philosophy with idealism and professionalism with realism.

The foremost contribution of e-governance in constructing universal society is evolving philosophical core of idealistic nature but conversion into empirical realities is not impossibility. The purity of society will depend upon true empowerments to awaken individuals. Empowered people will create knowledge-based society with complete knowledge of technicality of electronics. These knowledge workers need to follow ethical axis based on universal normative alliance. This fixes the high morality as the basic core of functioning that will help them to enact and enforce policies regarding evolving the egalitarian society. Humanitarian aspect is important outcome of this society, thus extending oneself psychologically to provide fruitful connectivity must be seen as an ultimate activity. This would mean creating a society with (a) philosophical idealism, and (b) professional realism. This is shown in Figure 2.

This clearly explains the future scenario in a conceptual framework. For getting better results, futuristic trends need to be controlled, structured, and recycled in to the society.

*Figure 2. Transformational forces*




## Conversion in to Empirical Realities

The fundamental question searched is, can we convert this philosophy in to empirical reality? To look for an answer, there is a need to identify conditioning factors. These factors are (i) the capacity of institutions to respond to the demands of changing needs, (ii) the preparing institutions of governance at different levels to manage resistances at various levels, (iii) the management of environmental inputs to deliver desired output, and (iv) the commitment to create society based on justice and equality has to be ascertained.

## CONCLUSION

The seeds of future lie in present. The power of mind and beauty of heart must work in consonance toward managing deprivations, depression, dehumanization, and desensatization which are adding to the misery of humankind. The fundamental question is can we rise above our individual ideas and identities? E-governance can be used as the important tool for releasing an individual from the capitivity of his or her parochial outlook and help him or her acquire a vision of coexistence in broader perspective to work toward humanity. Any concept which is devoid of philosophy is meaningless. Some of them may seem to be difficult to achieve, but it helps in maintaining a momentum to guide for future transformations. There lies a fragrant hope only if we allow new philosophies to emerge, then prediction about futuristic trends can be converted into realities. Some efforts are already in row; some need to be explored.

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## KEY TERMS

**Components of E-Governance:** Refers to "e" dimensions of various components, such as technological, social, cultural, political, psychological, service, and administrative, of e- governance. Interrelatedness and interdependence of these components will affect the output in the society.

**Idealistic Global Society:** This is idealization about the form of global society. It can be seen as an extended form of mega-structure. The objective is to merge positive traits from the world over patterns then to create a structure around virtuous elements.

**Quantitative Attributes:** In order to understand the variations and to control their impacts, conversion of quality into measurable quantas will be necessary. If planned properly, these can deliver the results. Many more can be identified.

**Value Structuring:** Three sets of values have been identified: (i) blokades values which are detrimental for transformation; (ii) plasmatic values, modified version of term plasma taken from science which refers to free flow of particles. The analogy here is that in society we also have some sets that can generate positive energy. Thus they must be recycled; and (iii) axial values which are fundamental values conformity, to which is essential for any particular society.

# Ecuador's Experience in E-Governance

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## INTRODUCTION

Countries in Latin America, nongovernmental organisms, private corporations, and international organisms are working on a preliminary phase to develop information communication technology (ICT) as well as national strategies to convert current weaknesses into opportunities for an information society (IS).

There are numerous initiatives which have promoted the introduction of IS and demonstrated significant progress and development in several countries. Latin American governments have begun elaborating a regional action plan, based upon the action plan resulting from the first World Summit on the Information Society (WSIS), in Geneva during 2003. They have also participated on the second phase of the WSIS. Currently, these governments are defining an integrated strategy for Latin America, taking inventory of the different activities carried out and monitoring progress. Latin American governments are working to form a unified agreement which allows for social progress and sustained development in the Latin American and Caribbean regions.

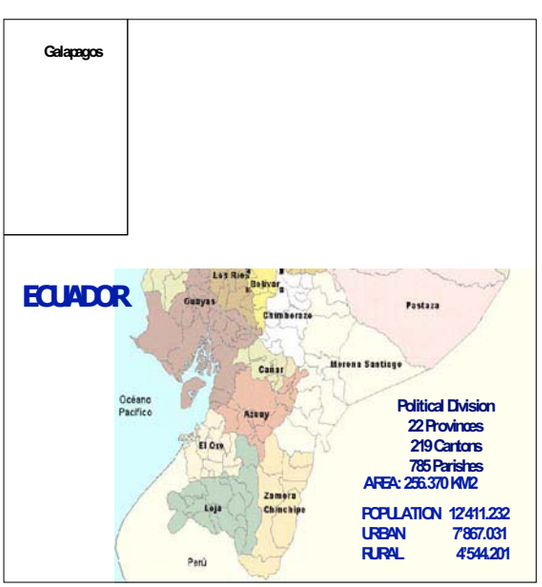
## BACKGROUND: ECUADOR'S GOVERNANCE PROBLEMS

Ecuador has several different levels of government; the central government, sectional governments, and local governments. The central government is characterized by only minimal national planning, a huge social debt, and a large foreign debt. The sectional governments, which are pushing for decentralization and modernization, have a strong commitment to support local governments, due to their practical viewpoint. Democracy only returned to Ecuador in 1978, and has not yet completely consolidated. Thus, democracy is quite fragile in Ecuador.

There are several governance issues which are currently quite evident in Ecuador:

1. **Social:** There is significant social and economic inequality characterized by a high poverty rate, migration, illiteracy, lack of national identity, and limited access to health care and education. Another problem is the issue of Colombians displaced by guerrillas.

*Figure 1.*




| Key Figures | |
|---|---|
| **Fixed Lines Installed** *Fixed teledensity* **– 2Q05** | **1,66** *12.6%* |
| **Mobile Subscribers** *Mobile teledensity 3Q05* ***GSM Subscribers*** | **5.39** *40.8%* *2,6* |
| **Internet Accounts** 2004 | **0,11** |
| **Internet Users 2004** | **0,19** |
| **PC's** - 2004e | **0,16** |
| **Regulatory "agency"** | **SUPERTEL** |

2. **Political:** Presently, there is a governance crisis, characterized by a lack of political leadership, lack of political coordination, corruption on public management, mistrust in political groups, and a mistrust of government in general.
3. **Economic:** There is mismanagement of public funds and a crisis in the banking sector.

## APPROACHES TO E-GOVERNANCE STRATEGY IN ECUADOR

The strategies of e-government in Ecuador must be implemented at each of the different levels of government.

The central government has a national plan designed for IS. A project presented to the Presidency of the Republic of Ecuador, called Government Unity of ICT (http://www.presidencia.gov.ec), proposes policies related to basic standards for transmission, management of digital documents, use of the Internet, digital equipment, and government regulations. In addition, recommendations are being made to government authorities for the elaboration of a national plan and policies related to ICT. The National Telecommunications Board—CONATEL (http://www.conatel.gov.ec)—has designed a proposal called the National Board of Connectivity, as an interinstitutional entity in charge of establishing and developing the National Agenda of Connectivity (http://www.conectividad.gov.ec) with central and sectional government. The Agenda has created programs such as e-government, governmental connectivity, governmental services online, Web pages for governmental institutions, information on government projects, Internet for everybody, e-education, e-health, and e-commerce.

The Presidency of the Republic has designed the governance and financial management systems to implement the project. The system of management for governance—SIGOB (http://www.sigob.gov.ec)—gives information support. The integrated system of financial management—SIGEF (http://www.sigef.gov.ec)—includes government accounting and thus, makes the nation's general budget accessible and transparent for every citizen.

Many government institutions have created their own Web sites, offering institutional information and consulting help such as the Central Bank of Ecuador (http://www.bce.fin.ec). Some institutions have incorporated systems to attend information requests such as the Superintendence of Corporations (http://www.supercias.gov.ec) and the Ecuadorian Social Security Institute (http://www.iess.gov.ec). There are also government organizations which carry out training and equipping programs and in departments such as the Ministry of International Trade, Industry, and Fishing (http://www.micip.gov.ec), the Ministry of Education and Culture (http://www.mec.gov.ec), and the Supreme Electoral Tribunal (http://www.tse.gov.ec). The Supreme Electoral Tribunal Web site allows inquiry about the assigned voting place and electronic voting. The Internal Revenue Services Web site (http://www.sri.gov.ec) includes a security information system, tax return, and tax payment on the Internet, and will soon allow for the managing of electronic invoices. CONTRATANET (http://www.contratanet.gov.ec) contains public contract processes, and is an Internet information system, which is transparent, reliable, accessible, and innovative.

The National Congress (http://www.congreso.gov.ec) has designed a project called Legislative Information System (SIIL). Its objective is to provide legal data on laws presented and resolutions taken. SIIL allows searches for citizenship participation, publishing of legislative acts, Web searches to access legislative information, the establishment of the e-vote, and document digitalization

The judicial branch of government also has a number of ICT projects (http://www.justiciaecuador.gov.ec). One project will set up the configuration of electronic formats of judicial decisions. Another project provides current information on the state of pending lawsuits available to the public and electronic notification.

Sectional Autonomous Government: Provinces and Municipalities, which depend financially on central government, are beginning to develop their own e-government strategies. Provincial Boards have their own informative Web sites. In particular, the Provincial Board of Pichincha (http://www.pichincha.gov.ec) is developing a program that will broaden ICT access for the poor and provide basic education to the rural population in that Province. This program is called "edufuturo" (http://www.edufuturo.com).

The Provincial Board of Guayas (http://www.guayas.gov.ec) community program called "telecentros", and the Provincial Boards Association of Ecuador—CONCOPE (http://www.concope.gov.ec)—have designed an interactive platform to provide information flow between the different Provincial Boards of Ecuador.

Cities such as Quito (http://www.quito.gov.ec) and Guayaquil (http://www.guayaquil.gov.ec) have resources to implement the project and are developing electronic payment platforms, while at the same time fostering direct citizen participation at their Web sites. The Municipality Association of Ecuador—AME (http://www.ame.gov.ec)—has a project which integrates every municipality through a national information ICT Web site. Many municipalities in Ecuador participate on the Andean Web of cities which have connectivity

between other cities and regions (http://www.redandinadeciudades.org). The Board of Parishes (counties) has an acquisition and training strategy for ICT.

Other Provinces and Municipalities are now designing an e-government strategy with the help of CARE. Care has also designed an e-government program called GOBEL. That program improves the efficiency and transparency in management; improves ICT's use and access capacities, software, hardware, and communication; and supports decentralization to improve decision making, expenses, and management control. The program also has designed a strategy due to the government's lack of knowledge about this topic. This strategy allows better negotiations with suppliers, includes a basic informatics infrastructure providing excellent results, and allows expansion possibilities to include other sectional governments.

## CRITICAL ISSUES

Although there are several e-government strategy initiatives, there is no coordinated national strategy. Therefore, technical, economical, and management problems frequently occur as well as management inefficiencies and the duplication of efforts. As a result, there are many independent Web sites providing national coverage using different technologies pertaining to different institutions. Unfortunately the site developers keep the information and advances to themselves which prevents the spread of technology to the rest of the country.

Since there is no national strategy for e-government, the following results are experienced:

- The coordination between central and sectional governments is almost nonexistent.
- Investment in technology is too expensive in Ecuador due to the lack of cooperation between institutions and lack of promotion for investments in technology.
- Training for public managers and citizens on ICT varies according to the type of technology that the institution requires.
- The costs of connectivity are high and access to communications difficult.
- There is a lack of public and government knowledge in regard to terms such as information society and e-government.
- Government distrust and fear is at a high level regarding public use of ICT.
- The digital breach increases progressively.
- Connectivity is limited due to language barriers.

## SOLUTION ALTERNATIVES

Ecuador requires a strengthening of the National Board of Connectivity so that it becomes an independent and highly technical institution. In order to accomplish this, the following steps need to be taken:

1. Cooperation must be developed between central and sectional government with specific national action plans to minimize the needed resources.
2. National Policies must be developed to strengthen the national communication infrastructure.
3. The intranet must be consolidated and citizenship participation promoted to encourage communication and information exchange between the public and government entities. On a national level a more efficient, legitimate, and transparent exchange of information must be implemented.
4. Secure public service platforms must be established with easy broad access to the public.
5. Training and education of ICT should be provided for government managers and the public with materials written in Spanish and other Ecuadorian languages. Education programs should be provided for children, teenagers, the illiterate, and persons with diabilities so the digital breach in Ecuador decreases progressively. As a result, poverty and inequality will be reduced and sustainable development enhanced.
6. Communication strategies must be designed to promote the implementation of ICT allowing universal access to this technology and its benefits. Opportunities to acquire ICT and appropriate fee structures to access ICT must also be created.
7. The hardware and software technological development must be consolidated with incentives for technological innovation, and adequate tax benefits to prevent the exodus of ICT professionals.

## CONCLUSION

The present social and foreign debt keeps Ecuador in the dilemma between attending the social problems which are of great importance in the country vs. investment in ICT to help the country progress technically. Until a proper balance is found Ecuador will continue to regress in the area of information society. Another national strategy which should be implemented is the renegotiation with foreign creditors to allow investment in programs related to e-government.

The success of e-government requires changing the way government presently functions to help the public.

In order to successfully implement e-government in Ecuador the following strategies are required:

1. Innovation between the governed and the government processes,
2. Political leadership for the success on an e-government strategy,
3. Strategic and sustainable investments to use resources effectively, and
4. Solid cooperation between the public and the private sector, nongovernmental organisms, and all international organizations.

It is important that legislation which restrains the use and development of ICT not be passed. Laws implemented should rather be flexible on the regulation of ICT so that its development is unimpeded. There should be constant evaluation and monitoring of the effectiveness of the e-government strategy. The success of e-government depends on the public trust in government institutions and their communications.

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## KEY TERMS

**Digital Divide:** Is the distance that separates those who have access to ICT from those who have it in a limited way or from those who do not have it at all; and thus, it increases the distance between each other in knowledge and information access and social and economic development.

**E-Government:** is the use that the nation makes of the ICT, with the purpose of simplifying internal management procedures and save costs, grant transparency to certain political procedures, make public services more efficient and effective, spread information of interest to the community by opening channels for citizen participation and thus, legitimizing the government's actions and decisions.

**Information and Communication Technology (ICT):** The umbrella term that encompasses the entire field of computer—based information processing: computer equipment, applications, and services, telecommunications links and networks, digital databases, and the integrated technical specifications that enable these systems to function interactively.

**Informatics Infrastructure:** The interdependent capacities and standards for digital communication and data processing (both hardware and software) that support the flow of information, much as a highway infrastructure support the flow of vehicles.

**Internet:** The vast network-of-networks that uses open rather than proprietary standards to support computer based communications at an incredibly large and efficient worldwide scale.

**Intranet:** Network of interconnected computers, designed to be used inside the company, university or organization. The difference between the intranet and free access internet is the fact that the intranet is private.

**Society of Information:** Study of social development characterized by the capacity of its members to obtain and share any information, from any place instantly and in the way it prefers.

**Universal Access:** Is the possibility that all the people, without exception could access, if they wish to the ICT. This possibility is considered in relation of the cost of the service, a reasonable distance of the homes, work of study places and the existence of special equipment for the persons with disabilities.

**Web Site:** Set of web pages that can form the whole unit. Even it is possible to have a web with an only page.

# E-Democracy and E-Economy in Africa

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## INTRODUCTION

A new world governance and economy characterised by globalisation has an increasing emphasis on knowledge and knowledge-transfer as the primary driver of economic growth, competitiveness, and participation. The economic, social, and political landscape in which future development will take place has then also changed. All countries, rich and poor, must now reconsider their approach to development to incorporate this new reality. Opportunities exist for poor countries to use information and communication technologies (ICT) to make rapid advances in their economic and political development, but there are also risks that a digital divide might widen the inequality between the "have's" and "have not's" across the world.

This article focuses on the role of ICT and the development of e-democracy and e-economy in Africa. The chapter will discuss the prospects and problems in enhancing e-democracy and e-economy in Africa by examining global and local obstacles to the access and use of ICT in many African countries. It also discusses whether ICT can empower people locally and regionally to participate more actively in politics, public affairs and economics.

## BACKGROUND: ICT OPPORTUNITIES IN AFRICA

In the process of globalisation, democracy and economy are expected to go hand in hand. The spread of democratic political order across the world is closely tied to global economy that is based on free market capitalism. Both trends assume as well as promote free flow of information, global communication, exchange of knowledge, and free movement of production of goods and services as well as wide participation of civil society.

The spread of Internet into Africa, the mushrooming of cyber cafes in African cities and major towns, personal computers and mobile phones have created a virtual global village, in which information and knowledge from most parts of the globe is accessible at the click of the mouse. The ICT access numbers have come up rapidly. As an indicator five years again, only a handful of countries had local Internet access, now it is available in every capital city. In 1996 just in Africa only, about 700.000 people had access to the Internet. However, Tokyo had almost twice as many telephones lines than the whole African continent. During the year 2000, sub-Saharan Africa had already passed the threshold of one telephone per 100 inhabitants. In the same year also all the African countries become connected to the Internet. According to a report by the UN Information and Communication Technologies Task Force (UNICT, 2002) in September 2002, the proportion of Africans with Internet access has risen by 20% between January 2001 and 2002.

Interactive local, national, and global communication and dissemination of information and knowledge is central in building democracy, participation, and economic productivity. This is particularly important in poor countries that face serious global and domestic economic, geographical or political challenges. Domestic challenges can include, for instance, the promotion of sustainable development and the eradication of poverty; the access to and allocation of natural resources; prevention, management, and resolution of conflicts with the reinforcement of peace, security ad stability; the endorsement of popular participation in the development processes, democracy and good governance; as well as the promotion of human rights.

The global challenges, for their part, consist of the promotion of competitiveness in the global markets; the exigencies of the emerging information and knowledge based societies of the 21st century; the continuous scientific and technological changes, and the incessant flows of new ideas, views, experiences, and opinions of development and international cooperation. Access to the global networks of ideas, policies, and practices would enable African across the continent to be at least more aware of what is taking place in the world markets; and to help them to design strategies to improve their competitiveness. (Modiddin, 2002; see also Annan, 2003; UNESCO, 2002.)

Wider entrance to the global village and centres of power and decision-making would enhance Africa's opportunities to acquire the competitiveness needed to be credible producers in those markets. The lack of it will leave Africa marginalised in global political economy. However, access to the global networks and global mar-

kets requires certain capacities, a combination of highly qualified human resources and technical productive capacity which is equally highly specialised and costly (particularly in terms of the initial costs), given African meagre resources and the many competing alternative demands on African development. (Modiddin, 2002) New world economy has emerged over the last decade as two long-run broad and overlapping trends: globalisation and advances in information and communication technology have converged. In this new economy, knowledge has replaced traditional productivity inputs, such as labour and natural resources, as the primary ingredient for economic growth. This has created a landscape to which countries must adapt their economic policies as well as their governance. Through the process of globalisation, capitalism has become the dominant form of economic organisation across the globe resulting in free flows of trade and capital.

Recent advances in ICT have increased the knowledge intensity within the production process and economy is now characterised by "knowledge" as the major factor in production and comparative advance. This has caused structural and qualitative changes in world economy, which need to be recognised and incorporated in global and local development policies. As Matthew Clarke (2003) points out, we need to focus on achieving knowledge-intensive development or *e-development*. Within the new economy, information is unbundled from its physical carrier and economics can be separated from the economic of physical objects. De-materialised markets and the digitisation of production and consumption mean that development policies have to overcome the traditional barriers of natural resources and to maximise an environment for the efficient working of the new economy (Clarke, 2003, p. 6).

## GLOBAL DIGITAL DIVIDE, E-ECONOMY, AND WORLD MARKETS

The new economy will not automatically end poverty, because poor countries lack the current type and amount of investment required to benefit from the new economy. Despite the fact that new telecommunication technology undeniably has advanced rapidly and more and more people around the globe have today direct access to it and to the information it conveys, there are still vast regions in the world which have either no or very limited access to these new means of communication and exchanging information. In fact, these places may have very restricted means for even local, let alone global, connections. Many regions lack even more traditional information channels such as mail, newspapers and books, telephone, television, or radio.

On the other hand, in many parts of the third world, and particularly in Africa, many of those countries, which now have the access to the ICT, have not succeeded in using it internally and internationally to promote local interests. Statistics show that even if the know-how and technology is already there and there are some signs of change, the distribution of the latest telecommunication technology is both globally and locally still very uneven. Of the approximately 816 million people in Africa in 2001, it is estimated that only 1 in 4 have radio (205 m), 1 in 13 have a TV (62m), 1 in 35 have a mobile phone (35m), 1 in 40 have a fixed phone line (20m), and 1 in 130 have a personal computer (5.9m). (UNECA, 2005). When we discuss the increasing numbers of Internet users, we should keep in mind that still it is only 0.2 per cent of Africa's population who actually has the access to Internet and that the lack of infrastructure and affordability has centralised these connections in the bigger cities and business centres. In 2000 there were only about 580 000 estimated regular Internet users in the LDCs, representing less than one per cent of the population and 0.16 per cent of global Internet Users. (See Molosi, 1999; Sarocco, 2002) Also in most African countries each computer with an Internet or e-mail connection usually supports a range of three to five users. This puts current estimates of the total number of African Internet users at around 5-8 million, with about 1.5-2.5 million outside of North and South Africa. This is about 1 user for every 25—400 people, compared to a world average of about one user for every 15 people, and a North American and European average of about one in every two people. (Figures for other developing regions in 2000 were: 1 in 30 for Latin America and the Caribbean, 1 in 250 for South Asia, 1 in 43 for East Asia, 1 in 166 for the Arab States). (The UNDP World Development Report, 2001).

While e-economy is to be promoted with e-democracy and e-development in general, it is important to notice that the obstacles in the access to information and knowledge are the same as the access to global markets in general. The lack of ICT in Africa is at least partly based on global economic inequalities. In most parts of Africa, the very same obstacles that we could overcome with the help of new information technology are the ones that prevent its widespread use in the poor parts of the world. Geographic isolation with no reliable means of transportation, lack of infrastructure together with lack of education and with severe poverty mean that there exists very few people who could use even the traditional communication channels, let alone the new technology. This entails that providers are charging high fees to make up for their investment costs. Because most private companies have to play according to the rules of market rationality, the service

providers are locked in charging excessively high prices in regions where there are less customers and where the connections are more difficult to establish. Therefore, the use of new technology such as the Internet or cellular phones in much of Africa remains limited to a small elite (who consists often largely of foreign business and donor representatives) who can afford the costs. This has kept the demand relatively low, which has meant limited competition and less interest from private investors. Thus, the prices continue to remain unaffordable to the wider public on the crass-root level. Also, when the use of ICT is considered in a global context it should be also kept in mind that many of those who are living in isolated rural areas around the third world have never even read a book leave alone a newspaper. And about half of the world's population has never made a telephone call.

There is a paradox in using ICT for enhancing democracy and economy in Africa: on the one hand, e-economy has been offered as the ideal solution to increase Africa's competitiveness in the world markets, on the other hand, markets themselves play an essential part in the unequal access to ICT across the continent and continents. What makes the situation even more complex is the fact that not only is information technology and its allocation led by the market forces, but information, in itself, has turned into a commodity one has to pay for.

The more valuable information is the more people are willing to pay for it. This once again, results into a market mechanism that makes it certain that the poor have even less chances in obtaining the most wanted and vital information. All in all, the vicious circle is created by the lack of infrastructure, unfavourable regulatory environment, high pricing, and uncompetitive market structure that cannot be broken without decisive intervention with focus on the realisation of human capabilities and social justice rather than the invisible hand of the globalised economy. If the lack of economic capacity competitiveness do not allow African countries a chance to democratically and equally participate in the world markets of ICT, it is hard to believe that ICT in itself can create more equality in global power relations or to provide all inclusive global economic and democratic participation in the near future.

It appears that in a global scale democracy and market economy do not necessary go hand in hand. Closing the knowledge and technology gap between rich and poor nations is not easy, and it appears to be particularly difficult in Africa. African countries appear to be pursuing a moving target, as the high-income industrial countries constantly push the knowledge frontier outward, and make it more and more difficult to reach. Indeed, even greater than the gap in access to knowledge technology is the gap in the capacity to create, disseminate, and exchange knowledge worldwide. Differences in some important measures of knowledge creation can then be far greater between rich and poor countries than the differences in income or economic activity. The information coming from African sources has difficulties in finding its way to the centres of intellectual, political, or economic power. (World Bank 1998/1999).

## E-DEMOCRACY AND LOCAL JUSTICE: PARTICIPATION IN NATIONAL POLITICS

The use of the Internet has grown relatively rapidly in most urban areas in Africa, in much the same pattern of adoption of the mobile phone, which followed shortly after. Thus, more people are better connected and have chances to exchange information. The question is, however, has this empowered African citizenry to participate in national and local policy-making or in the national or regional markets. The proponents of new technology are confident that ICT can play an important role in increasing civic involvement also in poor African countries. Creating and supporting these systems of e-government or e-democracy can help create a more direct relationship between people and their representatives, and empower citizens with knowledge that can help them make informed decisions. Working Internet and telecommunication connections can help citizens in developing countries to find government information, contact elected officials or regional offices, and research government programs; or, they can help in disseminating local information and concerns to the centres of power by setting set up Web sites for local and regional governments that will allow citizens to engage in all of the aforementioned activities.

While many African countries may still lack the economic competitiveness and related political influence, the digital age should then at least have brought more possibilities to local democracy and created changes to revive local economic activities. Since civic involvement and political participation can lead to economic development, this in turn, can lead to a more favourable performance by democratic institutions and more social trust of government by citizens. Across the region ICT could then offer new ways for providing access to essential information and knowledge as well as the potential for widespread knowledge sharing (of indigenous as well as global knowledge) that could have tremendous impact on the promotion of human development, alleviation of poverty and enhancement of economic activities and participation in political decision-making. It could create significant opportunities from governance and economic management. Domestically, citizens could have new ways

of online registration and voting, of communicating with their representatives and articulating their grievances about service deliveries by the bureaucrats.

Since the mobile phones and other telecommunication devices available are still very unevenly distributed and in poor countries it is mostly only the wealthy people who have access to new information technology and telecommunication services, the participation can not be equal either. The gaps are the greatest between urban and rural areas in Africa. There are almost three times as many fixed telephone lines per 100 in the largest city of lower-middle-income countries as in their rural areas, and more than seven times as many lines per 100 people in the largest city of low-income countries as in their rural areas. These gaps are even more significant given the fact that more than 50 percent of the population, and as much as 80 percent in the poorest countries of the world, lives in rural regions. (Hudson, 1997, p. 180-181).

All in all, the theoretical possibilities for promoting e-democracy and e-economy in Africa exist today. There are experiences in the practice of e-democracy and e-government worldwide that Africans could learn from. The revolutions in ICT and globalisation make it technologically feasible, accessible and eventually more affordable, to distribute information and to provide access to mutual dialogue in affairs of governance as well as of business. However, at the moment these opportunities are available only to those who already have had access to education, those who are well enough acquainted with the modern world and modern technology, and who can afford the costs. While these future leaders of African business and politics constitute the critical mass that supports the utilisation of ICT in all sectors of society: business, government, and civil society, they still represent a very small portion of the whole post-independence citizenry of many African countries. (Modidin, 2002, p. 12).

However, the problem is not merely about access to technology but also how can technology be used to enforce such democratic values as transparency, accountability, respect for human rights and equality. How can citizens who are concerned with Africa's endemic dismal socio-economic and political conditions, disappointed with the working of traditional democracy, frustrated with the quality and service deliveries of the public sector, worried about the future of Africa in a rapidly globalising world, and disenchanted with there ailing political leadership in Africa, find a way to successfully use ICT to enhance more open forms of governance? Will the new generations of African leaders welcome and promote the introduction of participatory e-democracy when the technical capacity has been reached?

Besides the questions that revolve around access, maintenance, affordability of e-technology, we need to pay attention to the evaluation of the possible consequences of implementing e-democracy on the structures and values of African societies, economy and politics. While improving the infrastructure and access we need to ask, whether e-Democracy will empower the ordinary people to effectively and meaningfully participate in the decision-making that affects their lives, livelihood and life-styles. Will e-Democracy really enhance the opportunities of the poor the disable and illiterate to be heard more clearly than before? Will it enhance their capabilities and opportunities to call to account those in positions of governance and public service? Will e-democracy make leaders and administrators more responsible, accountable and transparent—or will it strengthen the powers of the elites, the rich, the educated, and the corporate sectors at the expense of the ordinary people, and in particular the poor and marginalised? Could e-participation in fact further weaken what little influence the poor have over their rulers if the human face-to-face relations are eliminated and replaced by the impersonal virtual communication? Will e-democracy strengthen or weaken the African sense of community, cohesion and solidarity? Will it undermine the development of social capital so crucial to African economy as well as to the prevention of violent conflicts, creation of the enabling environment of peace and stability conducive to the promotion of human development? Can e-democracy mend the failure of traditional democracy and its inefficiency in Africa? Can e-economy provide for the alleviation of local poverty? (Modiddin, 2002, p. 13)

## E-SOLUTIONS AND ENVIRONMENTAL ECONOMY

While the access to relevant information has a central role in globalised economy and profitable markets, free market practice, civic education, and democratic ideals do not always go hand in hand. Particularly when technological advancement and information resources itself often does not reach them who would most need it and benefit from it. Instead, free markets tend to enforce the development of information society and lead into marginalisation of groups of people in a manner that prevents all the citizens from realising their capabilities as rational, moral, and political agents in the first place. If the distribution and use of ICT is left to the care of an invisible hand of the capitalist market forces, the result tends to be society fragmented by egoistic pursuits and self-interest and profits rather than a global village of wisdom. (See for example Lyons, 1988)

There is then a vicious circle involved in the idea that technology–or markets, for that matter–could be used to cure economic marginalisation: improved economy is first

needed to get into the technology markets to start with. New technology, for its part, is needed to participate in the new economy and in the global markets. Thus, there appears to be no direct connection between globalised information economy and global justice. Instead, people, particularly in the affluent part of the world, who have access to all the information channels available are not using the information they receive or the knowledge they process out of this information to share their prosperity and abundant resources any more equally—and in order to diminish the global suffering.

The fact that we can now, through satellite connections of television, radio, mobile phones and Internet, get information more easily, faster and more accurately about any natural disasters, famines, victims of war and conflict, sufferers of diseases, or in general about any human agony that happens anywhere in the world, has not radically increased our solidarity or changed our habits of sharing our prosperity with those who are in urgent need and/or live in absolute poverty. The moral problem then remains: if we cannot use the new ICT to take up our global responsibilities in affluent countries, how can we expect this technology to bring about local equality in the form of shared power and other essential resources in the underprivileged countries which have much less resources available, much poorer infrastructure, less efficient and inclusive educational systems and limited civic participation? Instead of providing essential channels of interactive communication to those who need it most, new information technology is still for the most part connecting those who are better off and better connected to start with. Simultaneously in many parts of the world, the worst-offs have become even more disconnected from the centres of influence, power and resources. (Heldman, 1994, p. 264-265)

If the traditional African values of solidarity and communal responsibility were taken seriously in the use and applications of ICT locally, regionally and globally we could promote more sustainable development everywhere. Resources could, for instance, be used to design computers that can be used away from electricity distribution grids. Such technology would enable potential users to bypass the inefficiencies of downstream power grids and could be environmentally friendly. Some positive initiatives have already taken place: for example non-grid dependent PCs have been applied to practice in the Mtabila refugee camp in Tanzania. People have been given access to the Internet as a result of a new source of electricity generation. The camp lies well away from the existing Tanzanian power distribution grid. So power is being generated using methane gas produced by fermented cow dung. There could also be ways to power computers by solar energy, if resources to work on these innovations were made widely available and affordable. (Ford, 2003, p. 53-54, Sarocco, 2002).

## CONCLUSION

The latest ICT that can be used for fast creation, acquisition, storage, dissemination, retrieval, manipulation and transmission of information, could greatly help the marginalised. It could make less affluent countries to benefit from the positive side of globalisation and to help them to promote local and global democracy. It could also provide them changes to more efficiently participate in global economy, that is, to take part in e-development itself. (Humprey, 2004; UNCTAD, 2004). ICT provides powerful means for more direct global and local democracy. However, as the sceptics point out, presently the trends of economic globalisation have not led to either to more equal local and global access to the ICT itself nor to the information it transfers. Instead, the information age has not yet significantly narrowed the gap between the affluent and the poor, connected and disconnected, developed, and less developed.

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## KEY TERMS

**E-Commerce:** The buying and selling of goods and services over the Internet.

**E-Democracy:** A neologism and contraction of *electronic democracy*, is the utilisation of electronic communication technologies, such as the Internet, in enhancing democratic processes within a democratic republic or representative democracy. The term is both descriptive and prescriptive. Typically, the kinds of enhancements sought by proponents of e-democracy are framed in terms of making processes more accessible, making citizen participation I public policy decision making more expansive and direct so as to enable broader influence in policy outcomes, increasing transparency and accountability, etc. Sometimes referred to also as *cyberdemocracy, digital democracy,* or *techno-democracy.*

**E-Economy:** The system or range of economic activity through ICT and digital means.

**Global Village:** A term, coned by Marshall McLuhan describing how electronic mass media collapse space and time barriers in human communication, enabling people to interact and live on a global scale. In this sense, the globe has been turned into a village by the electronic mass media and ICT in general.

**ISP:** Internet service providers (ISPs) provide access to the Internet via different communications channels such as traditional telephone lines or high speed fiber optics channel.

# E–Democracy and Local Government – Dashed Expectations

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## INTRODUCTION

This article examines the impact of information and communications technologies (ICTs) on electronic democracy at the local government level. It concentrates on measures taken by local governments in the United States, Canada, and the United Kingdom to transform their relationship to citizens by means of e-democracy. The emphasis on democracy is particularly important in an era when governments at all levels are said to be facing a democratic deficit (Hale, Musso, & Weare, 1999; Juillet & Paquet, 2001).

Yet, as this article argues by means of an examination of the available evidence in the United States, Canada, and the United Kingdom, e-democracy has failed to deepen democracy at the local level, this at a time when local government is said to be becoming more important in people's lives (Mälkiä & Savolainen, 2004). The first part of the article briefly summarizes the arguments on behalf of the growing importance of the city as a major locus of economic and political activity. It then discusses how e-democracy relates to e-government in general. Next, it discusses the normative relationship between two models of democracy and ICTs. The article then reviews the evidence to date of e-democracy at the local level of government in the aforementioned countries. Finally, it discusses why e-democracy has not lived up to expectations highlighting the dominance of neo-liberalism.

## BACKGROUND

It has become commonplace to observe that we are living in an era of unprecedented changes affecting all aspects of our lives, societies and the global order. Changes in technology, particularly ICTs, are frequently identified as being pre-eminent (Webster, 2001). The impact of technology is particularly noticeable on globalization. Within an environment in which the borders of the state become increasingly porous and the economy becomes organized on a global basis globalization has become "associated with 'hollowing out' nation states as powers are transferred upwards to international organizations, devolved downwards to more local governments, or dispersed to markets" (Gibbins, 2000, p. 675).

Moreover, no longer is governing confined to the structures and processes of government. Instead governance invites us to consider the "whole range of institutions and relationships involved in the process of governing" (Pierre & Peters, 2000, p. 1). The complexities of governance and the necessity of interacting with a wide range of networked social actors means that without ICTs modern governance would be difficult, if not impossible. Modern governance, then, is closely connected to e-governance, defined by Zussman (2002) as "no more and no less than governance in an electronic environment. It is both governance of that environment and governance within that environment, using electronic tools" (p. 2). Within this networked system of governance and e-governance there is e-government. E-government represents, as Zussman notes, a terrain, the public sector – including its institutions, people and processes that utilize electronic tools in the operations of government and in the provision of services to and engagement with the public. Within e-government there is e-democracy.

## GLOBALIZATION AND THE RISE OF THE CITY

In an age of economic globalization and instantaneous flows of information some argue that the economy and politics are being organized at a global level, disembodied from, if not superior to, place (Castells, 2000; Harvey, 1989). Others, however, disagree arguing there has been an increased emphasis on the local. Saskia Sassen, for example, notes:

*Economic globalization has mostly been represented in terms of the duality national/global where the global gains power and advantages at the expense of the national. ... Introducing cities into an analysis of economic globalization allows us to reconceptualize processes of economic globalization as concrete economic complexes in specific places.* (p. 205)

Moreover, as Beauregard and Bounds (2000) argue, when one combines the rise of "city-regions as the primary economic units in the global economy ... with the lessened identification of peoples with nations and the devolution of state policy to the local level, an urban citizenship begins to make sense" (p. 247). The rise of the city and the existence of a democratic deficit, speak, then, to the potential, if not need, for local governments to use ICTs to create new discursive spaces at the local level, the level of government closest to the people (Delanty, 2000).

This, admittedly, is an optimistic argument. However, before the potential of ICTs to deepen democracy within cities is examined, it is necessary to explore the relationship between e-democracy and e-government along with the relationship of information technologies to models of democracy.

## E-DEMOCRACY AND E-GOVERNMENT: NEW TOOLS FOR GOVERNANCE

As a part of e-government, e-democracy is intended to bring local governments, like all governments closer to the people. That said, e-democracy is nestled within the more general phenomenon of e-government which, in turn, is emblematic of the transformation of the public service in terms of its culture and organization as a consequence of the increasing diffusion of ICTs. (Ho, 2002; Layne & Lee, 2001; Moon, 2002; Norris & Moon, 2005). E-government represents a move away from the traditional bureaucratic paradigm with its emphasis on hierarchy, formality, command and control structures, and inward focus. The e-government paradigm is known for its flexible management, horizontal structures and processes, and for being outward-looking (Ho, 2002). It is thus said to be well suited to an era of networking and governance with its emphasis on users and citizens as empowered partners in governance. (Anttiroiko, 2004)

E-government implicitly rests on enhancing two aspects of the legitimacy of government. On the one hand, e-government is promoted because it can improve government performance and delivery of services, output legitimacy. On the other hand, it is promoted because it can provide additional means by which citizens can become engaged in the process of governing, that is, input legitimacy or e-democracy.

In turn, these two aspects of legitimacy are closely linked to a telos of e-government, linear phases claimed to culminate in more robust political participation. The most elementary of these linear phase models has three stages, those of static information, transactional services, and online communities. (Lenihan & Hanna, 2002) The provision of static information is the stage at which cities, for example, post information about the city. The second stage, transactional services, is interactive between the government and users permitting service and financial transactions. The third stage, e-democracy, our concern here, culminates in active citizen participation, online communities, which could include citizen-to-public official exchanges, or horizontal citizen-to-citizen dialogue.

## MODELS OF DEMOCRACY AND ICTS

While the first two stages are commonly depicted as emphasizing the improvement of government performance, all stages can potentially enhance democracy, not just the third stage. For example, the provision of information is a vital aspect of democracy providing transparency and ensuring government accountability. In fact, for the two main models of democracy considered in this section, pluralist and deliberative democracy, the provision of information is an important, but, albeit, not the only, requisite.

According to the pluralist model of democracy, articulated by Dahl (1967) and Schumpeter (1950), citizens do not participate directly in making decisions. Rather, they exercise influence through competing interest groups whose leaders negotiate and bargain with one another and decide on their behalf. Individually, citizens participate directly and infrequently by means of elections where they judge the performance of government and make rational choices among the representatives of political parties.

Clearly there is a close compatibility between pluralist democracy and ICTs. As Norris (2003) notes "new technologies multiply and fragment the access points for information, communications, and interactions between group representatives and public officials" (p. 5). In this sense, then, ICTs contribute to the pluralization and fragmentation of society and groups who can use these tools to organize and make demands upon government for improved policies and services.

By and large, few analysts of e-democracy view it as a means of promoting pluralist democracy (Barber, 1999; Chadwick & May, 2003; Hale et al., 1999). Rather, they extol the virtues of e-democracy as facilitating deliberative democracy as a remedy to the shortcomings of contemporary democracy, especially, the decline in public trust in political institutions and politicians along with declining voter turnout (Juillet & Paquet, 2001; Kearns, Bend & Stern,2002).

For proponents of deliberative democracy a deeper form of democracy than pluralist democracy is required. According to Yankelovich (1991):

*For democracy to flourish, it is not enough to get out the vote. We need better judgment, and we need to know how cultivate it. ... Good judgment is something that must be worked at all the time and with great skill and effort. It does not exist automatically; it must be created.* (pp. 102-103)

As a consequence, deliberative democracy places a strong emphasis on what Benjamin Barber (1999) describes as "dialogical" communication, direct, horizontal communication between citizens and citizens and between citizens and public officials.

In theory, e-democracy, in the form of more participatory and inclusive governance, has the potential to enhance deliberative democracy. As collaborative devices ICTs can potentially bring dispersed citizens together to form online communities promoting citizen interaction, dialogue, and judgment. ICTs also permit citizens to become producers of knowledge, thus democratizing public information and discourse.

## E-DEMOCRACY AT THE LOCAL LEVEL: A PROGRESS REPORT

With these models in mind the article now examines the progress of e-democracy at the local level in the United States, Canada, and the United Kingdom using extant surveys and reports on the adaptation of local e-democracy in each country. These three countries were selected because of their high state of e-government capacity and the fact that they are seen as strategic leaders in e-government innovation (UN, 2002). Moreover, the population in each country is judged to be Internet savvy.

### The United States

The roots of e-democracy at the local level in the United States go back nearly two decades, prior to the championing of e-government by the Clinton administration. Probably, the most noted of all e-democracy initiatives was the ill-fated Public Electronic Network (PEN) in Santa Monica, California that started in February 1989. Despite being adopted within a municipal political culture and administration supportive of this experiment in deliberative e-democracy, PEN failed to live up to its high promise. The quality of unmoderated discourse was judged to be poor, if not acrimonious at times, dominated by a small and vocal group of citizens with little participation from elected officials. With the arrival of the Internet interest in PEN declined further and the city shifted its priorities "away from discussion and towards the provision of information and electronic public services" (Docter & Dutton, 1998, p. 131).

Since then, there is little indication that deliberative e-democracy at the local level has fared particularly well in the United States. If the provision of online information is a barometer then pluralist democracy has fared better. An early study by Hale et al. (1999) of the municipal Web pages of nearly 300 Californian cities concluded "that municipal use of telecommunications technologies concentrates primarily on *information provision*, not the communication linkages that might promote the quality of democratic discourse" (p. 97). Exemplar sites that supported deliberative democracy were rare.

Later, nationwide studies in the United States come to much the same conclusion. Ho (2002) found that "only a few cities engage in online policy dialogues or partner with community organizations to strengthen citizen participation at the neighborhood level" (p. 8). A subsequent PEW study (2002) of 2000 mayors and city council members of the National League of Cities found that the Internet and e-mail had not deepened democracy to any great extent (p. 16). This is confirmed by a later study of Norris and Moon (2005) who assert that at all levels e-government in the "United States is principally informational—that is, it involves the one-way transmission of information from government to citizen" (p. 64).

### The Canadian Experience

Regrettably, the U.S.'s neighbour to the north, Canada, has fared little better in its evolution towards deliberative e-democracy at the local level. Studies indicate that e-government has failed to deepen democracy at the municipal level in Canada although the increasing provision of information could be seen as encouraging by advocates of pluralist democracy.

A number of studies indicate that most Canadian municipalities are at the informational and transactional stages of e-government with little progress towards deliberative e-democracy. Downey and Berdahl (2001), for example, found that of 152 municipalities in Western Canada only five had any type of citizen forum and only two provided online consultation.

Another study by Lenihan and Hanna (2002) indicated that most Canadian municipalities were at the first stage with others moving to transactional services. Indeed, most municipalities found it a "major challenge" simply ensuring information they posted was up-to-date (Lenihan & Hanna, 2002, p. 8). While this may be a significant contribution to pluralist democracy, Lenihan and Hanna found few municipalities had formed online communities with active citizen engagement. Municipal officials, moreover, expressed concern that the costs of maintaining online discussions would be too high and have dubious results (Lenihan & Hanna, 2002).

The most recent and exhaustive survey on the role of the Internet in municipal life in Canada by Fortin and Sanderson (2003) surveyed 304 municipalities in the province of Quebec focussing on the question of whether the Internet was "really being used to improve local democratic institutions and processes" (p. 5). Their conclusion differs little from other Canadian studies. They found that while virtually all Quebec municipalities have a Web site, progress towards a deeper notion of e-democracy has been slow. They found, for example, only 1% of Quebec municipalities had any public discussion forums related to municipal affairs (p. 1). They conclude that "there appears to be a clear gap or at least a significant lag between the [utopian] visions of some authors and the actual use of the Internet for these [democratic] purposes" (p. 8).

## The UK Experience

While the United Kingdom lagged behind the U.S. by at least five years when it came to pursuing e-government initiatives, the election of the Labour government in 1997 brought with it a concerted effort to modernize government at both the national and local levels (Chadwick & May, 2003; Pratchett & Leach, 2003). Since 1998 the emphasis in the UK clearly has been on moving from providing information to providing services but there has been less emphasis on e-democracy, particularly at the local level.

In a far-reaching study Kearns et al. (2002), attempted to ascertain the state of e-democracy at the local level in the UK, surveying 235 local authorities in England and Wales with follow-up research in a further 120 local authorities. They found "that, with the exceptions of a few islands of good practice, e-democracy is currently in a highly underdeveloped state" in the UK (p. 7). This mirrors the conclusion of Karakaya (2003) whose research indicated that the emphasis of local councils is primarily on offering e-services rather than online citizen involvement.

Illustrative of the very limited use of the Internet for citizen input to policy consultation, and debate was the survey of Kearns et al. (2002). They asked respondents in local councils two questions in this regard. First, did "local authorities use the Internet to invite submission of views from citizens as part of its consultation process," to which 70% responded, "yes" (p. 22). They then asked the following question: "Which of the following internet communication channels does the authority encourage for this purpose?" (p. 22). Overwhelmingly, the answers were either e-mail to a council officer (64%) or an elected member (23%). No more than 7% of local authorities provided for any type of moderated or unmoderated discussion, a reflection of the limited effort to develop e-democratic tools of citizen deliberation (p. 22). Moreover, the number of communications received by local authorities from citizens was very low, the predominant figure being less than 10 per month (p. 23).

From this perspective ICTs have not approximated their reputed potential to facilitate deliberative online democracy at the local level. On the other hand, advocates of pluralist democracy may take comfort from the fact that almost all local authorities are online in the UK and moving to providing online services. Yet, other experiments with online pluralist democracy, such as e-voting, have failed to stimulate higher voter turnout in local elections.

In May, 2003, under the supervision of the UK Electoral Commission, 59 pilot studies were conducted exploring innovative ways to vote in local elections including e-voting. The net effect of the e-voting pilot studies was that voter turnout only slightly increased. On the other hand, in those pilot studies where wards experimented with postal ballots voting turnout increased by about one-third, from 34% to 44%. Subsequent public opinion surveys found that of the two major pilot studies, the public found all-postal voting was quick and easy to use (UK Electoral Commission, 2003, p. 25).

## UNDERSTANDING WHY E-DEMOCRACY HAS NOT LIVED UP TO ITS POTENTIAL

For those who hope that ICTs would enrich the democratic process at the local level, the limited accomplishments of e-democracy must be a disappointment. For example, while the provision of online information is an advance, the record is spotty with the quality and type of online information found on local government Web sites an open question. Those who hoped that e-government would also bring a deeper, more deliberative form of democracy have reason to be dismayed.

There are a number of factors that help explain the marginal record of deliberative e-democracy. One approach has been to examine the way in which use of ICTs has been framed by governments since the 1990s. That is, e-government was developed within the broader ideology of neo-liberalism with its emphasis on the market as a model for governments to efficiently provide information and customer services to consumer-citizens. In particular, local e-government in the U.S., Canada, and the UK was framed and implemented within an ideological climate that de-emphasized the participatory, deliberative aspects of e-democracy (Ho et al., 2002).

Neo-liberalism and globalization have also had other related, negative consequences for local e-democracy. In

many instances superior levels of government have increased their regulatory and administrative oversight of local governments and weakened local governments by, for example, state-enforced municipal amalgamation and restructuring, and by reductions in transfers to municipalities (Ruppert, 2000).

Thus e-government was introduced in a period of declining resources for municipalities. On the one hand, this meant that e-government could be more easily "sold" as a means of bringing greater efficiency and savings to governments. On the other hand, the potential burden of increased transaction costs that could be imposed on public officials by e-democracy and citizen engagement practices in a time of resource scarcity dampened the enthusiasm of local government officials for deliberative e-democracy (Karakaya, 2003; Lenihan & Hanna, 2002). To all this must be added a preference on the part of locally elected officials, government officials and citizens for more orthodox means of interacting, for example, face-to-face meetings. This, then, raises the question of the demand for deeper forms of e-democracy (Karakaya, 2003; Kearns et al., 2002).

## CONCLUSION

No doubt a number of other explanations can be found for the weakness of e-democracy at the local level, for example, privacy related concerns (Norris & Moon, 2005). Certainly the utopian vision that ICTs could, by themselves, invigorate existing local political institutions has not been realized suggesting as Barber (1999) argues "if democracy is to benefit from technology then we must start not with technology but with politics" (p. 588). In effect, by starting with politics we must return to questions of power, difference, and antagonism that characterize all societies.

Viewed from this perspective one can ask if our models of democracy, in particular, deliberative democracy are appropriate models in which to envision the political and democratic uses of ICTs. Deliberative democracy, for example, with its emphasis on disinterested, rational argumentation in politics is claimed to be an impossible ideal. Instead, another model of democracy appears to be emerging, one that is more pluralistic, contentious, and agonistic in nature, but not in the form of pluralism with indirect and infrequent participation by citizens as outlined above (Mouffe, 1999, p. 745).

In an era of governance, political participation is widening beyond state institutions, becoming more direct and confrontational with the Internet instrumental in this regard (Norris, 2002). By focussing on the democratic uses of ICTs within a state-centric local government context, our approach may be too narrow. Local politics need not be equated with official, accepted modes of citizens' interactions with the state (Garber, 1997, p. 35). Those who take a social movement approach argue that, thanks to ICTs, local politics has become closely linked to broader, global forces.

This, it is argued, is particularly true with respect to anti-war and anti-economic globalization movements. Here, ICTs have proven to be useful, democratic tools, permitting local groups to collaborate on a global level, opening up new and contentious forms of political space (Smythe & Smith, 2003).

What this suggests is that research into the democratic uses of ICTs at the local level should take a less state-centric tact, one that does not focus, for example, on the stages of e-government or the meagre steps local governments take towards deepening e-democracy. Rather, there should be greater emphasis on how local citizens, civil society organizations, and social movements, as users, decide for themselves how they are going to use ICTs. Beyond this, greater attention must be paid to how these local citizens and organizations, as political agents, use ICTs to form complex translocal and transnational ties that come together to shape complex, hybrid forms of contested politics in which global politics are localized and localities transnationalized (Smith, 2001).

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## KEY TERMS

**Deliberative Democracy:** Refers to the centrality of disinterested reason, rational persuasion, and dialogue in politics. It involves a process by which the common good in a society is derived from "collective deliberation conducted rationally and fairly among free and equal individuals" (Benhabib, 1996, p. 69).

**E-Democracy:** The use of ICTs, in particular, the Internet, to facilitate democratic practices. This ranges from the provision of information by governments to citizen participation and dialogue, that is, interaction among citizens and between citizens and policy-makers.

**E-Governance:** Defined by Zussman (2002) in terms of process as "no more and no less than governance in an electronic environment. It is both governance of that environment and governance within that environment, using electronic tools" (p. 2).

**E-Government:** The use of electronic tools by the public sector in the operations of government and in the provision of information and services to and engagement with the public.

**Globalization:** Defined by Held, Mcrew, Goldblatt, and Perraton (1999) as "a process (or set of processes) which embodies a transformation in the spatial organization of social relations and transactions ... generating transcontinental or interregional flows and networks of activity, interaction, and the exercise of power" (p. 16).

**Governance:** Originally derived from the Greek "to steer" it refers to the way societies or organizations steer themselves. Referred to by Pierre and Peters as "the whole range of institutions and relationships involved in the process of governing" (p. 1). Governance can include a variety of social actors, public and private, which are steering society on a variety of levels, local, national, and global.

**Neo-Liberalism:** An ideology that argues that markets and consumers, not governments and citizens, should be the arbiters of what is best for society. It emphasizes government downsizing, de-regulation, and privatization.

**Pluralist Democracy:** Refers to a model of democracy in which society is divided into numerous groups and power dispersed. According to this model, between elections democracy is maintained by competing and countervailing centres of power in which leaders of interest groups check one another and prevent any one interest group from abusing its power. Individually, citizens participate directly and infrequently by means of elections where, as voters, they judge the performance of government and make rational choices between competing elites, representatives of political parties.

# E-Democracy Policy in Queensland



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## INTRODUCTION

The term e-democracy has tended to be used interchangeably in the literature with e-governance or e-government, and these terms have been described as "being in a constant state of definition, redefinition, and evolution" (Riley, 2002). For the purpose of this article, e-democracy is seen as one facet of a wider use of information and communication technologies (ICTs) in the business of government, where the focus is on increasing citizen participation in the public decision-making process rather than using ICTs to deliver government information, programs and services, to make financial transactions electronically, or to enhance government internal administrative practices such as record-keeping.

E-democracy has been variously defined, described in one report as "easier to recognise than define" (Kellner, 2004). New terms have also been coined, such as m-democracy—"m" for mobile, addressing mobile communication technologies separate from electronic processes such as the Internet that are more commonly used for e-democracy (Brucher & Baumberg, 2002). The case study that follows proposes a simple definition: "E-democracy refers to the use of information and communication technologies in democratic processes."

E-democracy covers a wide range of activities that support public participation in democratic processes, including electronic voting, online consultation, Web-based discussion forums, electronic petitions to parliament, using the Internet to Webcast parliamentary debates, and digital polling and surveys. Clift (2002a) lists the leading e-democracy practices as e-mail notification as an active information dissemination tool; online public hearings and consultations; ICT use by members of parliament for electoral engagement; digital recording and availability of public hearing recordings and materials; and ICT-enabled local civic deliberations and global networking.

## BACKGROUND

Historically, e-democracy has emerged in many countries, driven by a number of factors including a need to address declining levels of public trust and confidence in government and increased public expectations for governments to be responsive, accountable and effective. ICTs provide an excellent medium for engagement between citizens and government in terms of capacity to reach to a wide audience, timeliness, accessibility, convenience, and efficiency of information exchange.

E-democracy is a fairly recent phenomenon internationally, and is undergoing rapid developments at both practical and conceptual levels. It is an evolving area and for that reason, there is no comprehensive body of knowledge that agrees on what e-democracy is intended to deliver, or even how it is defined. According to recent reviews and practice discussions (e.g., Riley, 2004), there is no single-agreed approach to how e-democracy will eventually take form. There is certainly no established policy base to guide development and implementation. In fact, some in the field have argued that it is yet too early to have a comprehensive policy about e-democracy, and that governments should introduce e-democracy as an ongoing series of projects or initiatives instead (e.g., Chen et al., 2002). Clift (2002b) notes that while a government e-democracy policy is not necessary to provide useful online democracy services, high level policy direction serves to accelerate and deepen second and third generation applications and a strong e-democracy policy with specific measurable goals is essential to promote long-term progress. Morison (2002), in a Northern Ireland executive briefing paper on e-government, suggests that the introduction of an "e-democracy charter" should be considered.

In a recent overview of e-government and e-democracy, the United Nations Department for Economic and Social Affairs (2003) *World Public Sector Report 2003: E-*

*government at the crossroads* surveyed approximately 190 member countries and found that only 13 (8%) have direct/clear statements or policy encouraging citizen participation. These policies do not necessarily address e-democracy explicitly.

Some countries are currently in the process of establishing formal policy for e-democracy. For example, in June 2002 the UK government published a consultation paper *In the Service of Democracy* (HM Government & Ukonline, 2002) outlining a possible policy on e-democracy and calling for public submissions. A report on the consultation process and its outcomes has been posted (HM Government & Ukonline, 2002), however the government's response is still to be published (E-Government Unit, n.d.).

To date, the state of Queensland in Australia appears to be the only place where e-democracy initiatives have been introduced within a formal policy framework by state government. The case study below describes the policy framework and lessons learnt from a review of that framework after two years of operation.

## CASE STUDY: QUEENSLAND'S E-DEMOCRACY POLICY

### The Queensland Context

The state of Queensland has a small population of approximately 3.7 million spread over a widely decentralised area of around 1.7 million sq km. In this context it is particularly important that more innovative and accessible avenues are made available to its residents (particularly those living in rural and remote areas) to have the opportunity to have their say on matters that are important to them and their communities. In Queensland, people's access to a computer and the Internet has been steadily rising with over 63% of the adult population having access to the Internet or email at home when surveyed in May 2003, making the use of ICTs for democratic engagement a reasonably accessible option for the majority of residents.

The Queensland government is internationally acknowledged as having a particularly active e-democracy agenda and has trialed and evaluated a number of digital democracy initiatives. It is the first and possibly only government to have introduced digital democracy projects within a comprehensive published e-democracy policy framework.

### The 2001 E-Democracy Policy Framework

Queensland's *e-democracy policy framework* was released in 2001 and three specific initiatives—e-petitions, Internet broadcasting of parliamentary proceedings, and online community consultations, were progressively put in place over the next 18 months. Online polling was introduced in mid-2004 with the government making a prior commitment to legislative change to implement the outcome of the first public poll. The policy framework has been revised to take account of new and emerging technologies beyond the Internet. This new framework reaffirms the Queensland government's commitment to using new and emerging ICTs to improve community outcomes and will guide further initiatives currently being developed to integrate digital democracy more fully into wider community engagement practice and government decision-making processes.

The key features of Queensland *e-democracy policy framework*, introduced in 2001, are shown in Table 1.

The policy was informed by developments in the field. Lessons learnt from the international body of knowledge

*Table 1. Key features of Queensland's 2001 e-democracy policy framework*

- A specific definition of e-democracy, centred on Internet use
- An explicit commitment by government to using Internet technology to strengthen representative democracy in Queensland
- Specific acknowledgement that it is the government's responsibility to expand the channels of communication to reach as many citizens as possible
- A clear statement that e-democracy processes will complement existing forms of consultation
- A commitment to addressing key issues of equitable online access, responsiveness, privacy, security and authentication
- A reporting protocol for government's response to citizen input
- Reference to specific standards for addressing privacy and information security
- Links to related government policies, such as the *Queensland Communication and Information Strategic Plan*
- Introduction of the e-democracy initiatives on a trial basis to be evaluated after two years
- A commitment to continuing to explore e-democracy and the opportunities provided by new technologies.

at the time the policy was developed included the importance of addressing key policy issues such as equitable online access, responsiveness, privacy, security, and authentication.

## Review of the 2001 Policy Framework

The policy was reviewed in late 2003. That review process included (1) a gap analysis against developments in the field based on international research and practice literature review; (2) assessment of the policy document against generic good practice policy features such as effectiveness (i.e., whether likely to work in principle, based on factors such as logical cause and effect links and realistic outcomes), feasibility (i.e., whether likely to work in practice, based on operational and administrative viability and legal robustness criteria), strategic focus, stakeholder acceptability (e.g., equity considerations, cost-effectiveness, political sustainability), form (i.e., clearly articulated, internally consistent), development process (eg stakeholder input, evidence informed), and provision for review and evaluation; and (3) a review of implementation issues and preliminary outcomes based on consultation with government stakeholders.

The policy review identified a number of critical features for effective policy in this area. Key issues are summarised in Table 2.

Several specific issues considered particularly important in good policy making for e-democracy are described in more detail as follows.

As with policy in any area, it is critical that desired outcomes are made explicit and that there are logical and credible links between actions taken under the policy and these desired outcomes. This is perhaps one of the most challenging aspects of e-democracy policy-making, given the stage of development of e-democracy policy and practice internationally.

As an example, Table 3 sets out outcomes, objectives, and intervention logic derived from the review of the Queensland policy framework. The policy outcomes and e-democracy policy objectives relate to the overall e-democracy policy framework. The intervention logic (or cause and effect rationale) linking objectives and key elements of the outcome are described, which provides the basis for particular actions or initiatives to be introduced under the policy (such as online consultation, e-petitions, and provision of capacity-building tools and resources online). Objectives for some of the individual initiatives introduced under the Queensland policy framework are also set out.

The development of explicit principles to underpin an overarching e-democracy policy framework also provides particular challenges for policy makers. Ideally, these are developed with wider government policy considerations and strategic directions in mind and are aligned with policy in related areas to provide a coordinated and consistent approach that increases the likelihood of e-democracy initiatives being taken up and integrated into practice across the whole of government.

*Table 2. Issues for effective e-democracy policy*

- **Privacy and Security:** E-democracy initiatives provide, and are seen to provide, a safe and secure channel for engagement
- **Inclusiveness:** Promotes access for "hard-to-reach" groups; facilitates accessibility for specific needs groups such as people with a disability; accommodates social and cultural diversity and differing levels of ICT skills and technical capacity
- **Outcome Focus and Rationale:** Clarity of outcome to be achieved and policy benefits are made explicit
- **Principle-Based:** Underlying principles guiding e-democracy processes and developments are articulated--policy is not simply a description of existing or proposed activities
- **Role Statement:** Explicitly articulating government's role and commitment
- **Responsiveness and Feedback:** Acknowledging, considering, and reporting on input provided through e-democracy initiatives
- **Coordination and Integration**: Online processes are integrated with off-line activities to provide a coordinated engagement response; integrating e-democracy outputs with mainstream decision-making processes
- **Flexibility:** Responsive to the rapid changes in the field; open to innovation and uptake of new developments
- **Capacity Building:** Facilitating readiness of government and community users to take maximum advantage of the opportunities provided by ICT-enabled engagement processed
- **Review:** Stated commitment to learning from experience and knowledge sharing; ongoing review mechanisms built in from the start

*Table 3. Outcomes, objectives, and intervention logic example*

- **E-Democracy Policy Outcome:** Inclusive, informed and productive public involvement in decision-making through the use of ICTs
- **E-Democracy Policy Objectives:**
  - Provide safe, secure, and efficient ways for people to interact with Queensland government, Parliament, and each other on public policy issues that are less limited by accessibility constraints such as place, time, cost, and existing networks than traditional avenues
  - Increase knowledge and understanding about democratic processes and public policy issues in the community, which can in turn promote better policy choices, decisions, and outcomes
  - Build capacity and active participation of those involved in democratic engagement, including individuals or communities contributing to public policy making as well as public officials and elected representatives engaging with the community on these matters
  - Demonstrate government's responsiveness to public input and transparency of decision-making
- **Alignment of Outcomes and Objectives:** The "cause and effect" rationale linking the objectives and key elements of the desired outcome
- ***Inclusive* Public Involvement:**
  - Providing ICT-based opportunities for engagement promotes input from sectors of the community that may not engage through the more traditional avenues
  - ICT-based engagement processes need to be perceived as safe and secure to overcome known public concerns in interacting with governments electronically
  - ICT-based engagement avenues are more likely to be taken up if they provide, and are perceived as providing, an efficient process for engagement
- ***Informed* Public Involvement:**
  - Informed involvement is facilitated by providing convenient access to government held information
  - Informed involvement requires an understanding of democratic processes and how to input effectively into government decision-making processes
- ***Productive* Public Involvement:**
  - Providing tools and support that builds individual skills and community capacity to engage effectively with government produces more productive engagement outcomes
  - A critical factor in determining both the level of public engagement and the quality of information exchange is a demonstrated commitment by government to consider the issues raised and provide feedback on how public input has been used
- **Objectives for Individual Initiatives under the Policy:**
  - E-Petitions:
    - To provide an additional avenue for the public to raise issues directly with Queensland Parliament that is safe, secure, efficient, and readily accessible
    - To provide a central location where the public can learn about and support petitions of which they may otherwise have been unaware
    - To deliver greater transparency and responsiveness around e-petitioning
  - Online consultation:
    - To provide an additional avenue for the public to engage in the Queensland government's decision-making processes that is safe, secure, efficient and readily accessible
    - To open up the Queensland government's decision-making process to those who may not be reached through traditional consultation methods
    - To increase the transparency of consultation processes through the publication of consultation responses and the commitment to publish a Government response after the consultation activity has closed
    - To provide a central location where the public can learn about consultation opportunities of which they may otherwise have been unaware
- **Internet Broadcasting of Parliamentary Proceedings:**
  - To enhance public access to parliament and parliamentarians, particularly by those Queenslanders restricted in their capacity to access then physical environs of Parliament in Brisbane
  - To provide an avenue for the public to learn about parliamentary processes and issues

## Lessons Learned and the Development of the Revised 2004 Policy Framework

The conclusions of the 2003 policy review were that the 2001 policy framework had provided an appropriate and robust framework for introducing e-democracy on a time-limited trial basis in Queensland and that many of its elements still provided a sound basis for current practice, but that some aspects could be enhanced given strategic developments in the field since its introduction. Specifically, the review concluded that the framework could be enhanced if extending the policy from a trial to a permanent basis by expanding the definition of e-democracy

*Table 4. Key features of Queensland's 2004 e-democracy policy framework*

- A definition of e-democracy referring to the range of ICTs, including the Internet, interactive digital television and mobile communication systems
- An explicit commitment by government to using new and emerging ICTs to improve community outcomes and articulating government's role in building the capacity of individuals and communities to engage in democratic processes
- An explicit e-democracy outcome statement of "inclusive, informed and productive public involvement in decision-making through the use of information and communication technologies" and four specific objectives relating to (1) providing safe, secure, efficient and effective avenues, (2) increasing knowledge and understanding, (3) building capacity and active participation, and (4) government responsiveness
- A set of nine underlying policy principles (see Table 5)
- New e-democracy directions for Queensland outlining immediate priorities
- A statement of e-democracy policy benefits
- Situating e-democracy within wider Queensland government policy
- Continuing commitment to addressing key e-democracy considerations, such as privacy and security, equitable online access, and using e-democracy to complement not replace traditional forms of engaging with government
- Explicit reference to ongoing review and evaluation

beyond Internet application to include other ICTs, articulating government's capacity building role in this area, documenting explicit statements of desired outcomes, introducing a more generic focus built around strategic policy intentions and supporting principles rather than designated initiatives, and updating the links to related government policy.

A revised policy framework was launched in 2004 based on the lessons learned from two-years experience with e-democracy policy in Queensland, taking into account the outcomes of the policy review and addressing all of the issues for effective e-democracy policy listed in Table 2. An evaluation framework was also developed at this time (presented in a separate chapter) for evaluating both the overarching policy framework and individual e-democracy initiatives operating under the policy.

Key features of the 2004 policy framework are set out in Table 4 and the policy can be viewed in full on the Queensland government's *Get Involved* Web site at: http://www.getinvolved.qld.gov.au/share_your_knowledge/resources/documents/pdf/edemocracy_pf.pdf

In Queensland, e-democracy is strategically positioned within a wider community engagement context. Community engagement refers to the many ways in which governments connect with citizens and communities in the development and implementation of policies, programs, and services. The Queensland government has adopted an integrated, multi level approach to community engagement that includes innovation and reforms in Parliament, executive government and across public sector agencies. The e-democracy initiatives support engagement at all these levels. Table 5 sets out the policy principles underpinning e-democracy given this wider context. They are based on a merging of e-democracy considerations with existing whole-of-government policy principles for community engagement.

The Queensland experience reinforces the position that effective policy can be made that guides and coordinates the development of e-democracy activities and that sets strategic directions for the future.

## FUTURE TRENDS

At both a national and international level, the experimentation with e-democracy by governments is largely in its infancy, with the development and delivery of electronic services and transactions taking priority. There are a growing number of examples of innovative e-democracy projects being introduced by many different countries. Widely cited examples over recent years include the Hansard Society's online consultations for the UK Parliament (Coleman & Gøtze, n.d.; Parliament and Constitution Centre, 2003), Sweden's Democracy Square and other local government initiatives (Gøtze, 2001, Swedish Association of Local Authorities and Swedish of County Councils and Regions & Department of Democracy and Self-government, n.d.), e-petitioning in Scotland (Macintosh, 2003), online consultation by the Canadian Environment Assessments Agency (Poland, 2001), and the Minnesota e-democracy project (e-democracy, n.d.). However, they appear to be implemented as isolated initiatives that are not grounded in explicit statements of policy. As noted in one report "e-democratic experi-

*Table 5. Policy principles underlying Queensland's e-democracy policy framework*

- **Inclusiveness:** Using ICTs to broaden community involvement in government decision-making processes, including with hard-to-reach groups
- **Reaching Out:** Using ICTs to improve access to information and assist knowledge sharing and deliberation, so as to deepen input to government decision-making
- **Mutual Respect:** Applying consistent standards of respect for listening and responding to the views, concerns and experiences of Queenslanders whether they communicate with government using ICTs or more traditional forms of communication
- **Integrity:** Making effective use of ICTs to improve access to information that promotes informed deliberation and transparent decision-making
- **Affirming Diversity:** Using ICTs to promote and incorporate diverse opinions and perspectives into government decision-making
- **Adding Value:** Using ICTs effectively and efficiently to build partnerships and work productively together
- **Security and Privacy:** Ensuring privacy protection, information security, and identity authentication are addressed so that Queenslanders feel confident in participating online
- **Expanding Channels:** Using ICTs to complement traditional forms of community engagement
- **Innovation:** Research and ongoing review to identify new opportunities, build an evidence base of what works, and share knowledge to enhance good e-democracy practice

ments have mushroomed around the world far in advance of any thoughtful theoretical analysis" (Kane & Patapan, n.d.).

This appears to be changing, with an emerging focus on establishing a formal policy base to guide e-democracy practice in various countries, for example, the UK government's consultation paper *In the Service of Democracy* described earlier.

## CONCLUSION

An important aspect of the development of a body of knowledge guiding research and practice in e-democracy is articulating the policy underlying the introduction of individual e-democracy projects. From a conceptual point of view, we need to know more about why e-democracy is deemed to be an appropriate response given the particular policy context operating in the particular place and time. From a practical point of view, understanding the policy purpose better targets implementation options and practice directions. From a research and evaluation point of view, we need to know what is intended to be achieved in order to determine if what has been done is effective so that improvements can be made. The Queensland case study provides an example of a policy framework for e-democracy initiatives.

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## KEY TERMS

**E-Democracy:** The use of information and communication technologies (ICTs) in democratic processes.

**Electronic Petitions:** ICT-enabled lodging of public petitions with Parliaments.

**Electronic Voting:** An ICT-enabled process for determining the public's collective intent.

**ICTs (Information and Communication Technologies):** The class of technologies that allows the processing, storage and communication of digital information, including networked and portable computer systems, advanced mobile telephone systems and services, interactive digital television, and similar applications.

**Online Consultation:** Use of the internet to facilitate a process of discussion between those proposing a course of action and those likely to be affected by those actions.

**Public Policy:** Authoritative statements of general applicability establishing intent or planned action by governmental entities.

**Public Participation:** The involvement of citizens in governmental decision-making processes and activities.

**Webcast:** The delivery of live or delayed sound or video broadcasts using Web technologies.

**Web-Based Discussion Forums:** Use of Web technologies to provide a space where people can exchange views on a particular area of interest.

# E-Development in Bangladesh

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## INTRODUCTION

Numerous factors, like political stability, physical infrastructure, basic healthcare, and so forth influence the extent and speed of social and economic development. There is no suggestion that ICT can eliminate the need for these or offer a panacea for all development problems. But detail analyses of experience around the world reveal ample evidence that, if used in the right way and for the right purposes, ICT can have a dramatic impact on achieving specific socio-economic development goals, as well as, play a key role in broader national development strategies. The real benefits lie not in the provision of technology rather in its application to create powerful socio-economic networks by drastically improving communication and the exchange of information (Vulkan, 1999).

Recent developments in the fields of communications and information technology are indeed revolutionary in nature. Information and knowledge are expanding in quantity and accessibility. In many fields, future decision-makers will be presented with unprecedented new tools for development. In such fields as agriculture, health, education, human resources and environmental management, or transport and business development, the consequences could be really quite revolutionary. Communications and information technology have enormous potential, especially for developing countries, and in furthering sustainable development (Hamelink, 1997).

ICTs have therefore brought about a new hope for the developing world. Many of these countries continue to labor in the agricultural age and their economic development is thus restricted and unable to move on and catch up with the developed world. Most developing nations have also been unable to industrialize their economies leading to greater impoverishment and dependence. In this context, the very prospect of "leapfrogging" the traditional stages and cycles of progress, is seen as revolutionary. Telemedicine, distance education, wireless applications, the use of the Internet for a wide variety of critical information dissemination tasks—hold the promise of overcoming fundamental barriers of infrastructure which have plagued the developing world (Mody, 1999).

## BACKGROUND

In examining the use of ICTs for development between 1995-1997 conducted by the United Nations Commission on Science and Technology for Development (UNCSTD), the Working Group on IT and Development noted that despite the positive impacts experienced in the industrialized countries and certain sectors of many developing countries, evidence showed that there were many people, especially in the least developed countries whose lives had been barely touched by ICTs.

In this context, Mansell and Wehn (1998, p. 6) raise some crucial questions, which should be urgently addressed by the political leaders and citizens of the developing world:

*Are the benefits of the increasingly widespread, albeit uneven, diffusion and application of these technologies outweighing the risks for developing countries? Are the stakeholders in developing countries taking appropriate measures to minimize the risks of social and economic exclusion that could be associated with these revolutionary technologies?*

ICT has changed the course of development in the Asia-Pacific region. It has, however, not progressed at the same pace of change and progress across all countries. Connectivity, infrastructure, human capacity and knowledge creation and exchange, underpinned by cohesive national e-strategies fed into national development plans remain a daunting challenge, with some countries seizing the opportunities for enhanced development provided by ICT, better than others. Efforts are needed to level playing fields and encourage strategic and effective use of ICT to further human development and help eradicate poverty.

## VISION

Bangladesh seeks to build an ICT-driven nation comprised of a knowledge-based society by 2006. To meet this overall vision, the nation must develop a country-wide ICT infrastructure to give all Bangladeshis access to information. This will empower citizens, enhance demo-

cratic values and promote sustainable economic development. The infrastructure will be used for human resources development, governance, e-commerce, banking and public utilities, among other functions. A National ICT Task Force, headed by the Prime Minister, has been formed to help Bangladesh realize its established vision. (The World Bank & Centre for Advanced Studies, 1998).

## NATIONAL POLICIES

The Bangladesh Telegraph and Telephone Board (BTTB) will shift from its role as a service provider to an infrastructure provider for telecommunication service providers and ISPs. The BTTB will work to make use of underutilised resources of other public utility sectors (e.g., gas, railways). Such resources may include land, radio towers, power pylons, cable ducts, etc. Establishing the national Internet access platform must not affect the functioning of the present telephone network. Increased teledensity is essential, and advanced and new technologies must also be introduced in all areas. A national high-speed backbone and high-speed gateway facilities will be established to facilitate the installation of ISPs. Telecommunications facilities will be made available to all parts of society and at an affordable cost, and Internet-access will be provided to educational institutions and libraries. The country will promote the launch of cyber kiosks in all post offices and similar facilities.

To meet growing demands, infrastructure will be expanded immediately in the public and private sectors, and will reach out into rural and under-served areas. Liberalization of telecommunications and little or no customs duties will facilitate the construction of this infrastructure. As cellular mobile phones are increasingly used for functions such as emailing, customs duties on these items should also be lowered.

## CURRENT STATUS OF THE ICT SECTOR IN BANGLADESH

### Overview of the ICT Sector in Bangladesh

ICT infrastructure encompasses the transmission, storage, processing, and display of voice, data and images. This includes devices ranging from cameras and compact disks to mobile phones and computers. Depending on the requirements, a connected ICT infrastructure may be wired, wireless, automated, manual, or a combination of all. At present, connectivity requirements in Bangladesh are still relatively basic, with public access to telephones among the most inadequate in South Asia. The Public Switched Telecommunications Network (PSTN), the backbone of any ICT infrastructure, remains restricted to parts of Dhaka and major towns, with limited penetration in rural areas. The present state of ICT infrastructure does not include even the most basic services and information on an institutional level, and while poor legislation is the cause, the absence of public awareness to the benefits of such services and information has allowed this situation to prevail. The mobile sector is developing rapidly, primarily as a substitute for people who do not have a fixed line. The majority of these users are restricted to voice communication and some peripheral data services, and do not have universal access to the fixed line network (Kayani & Dymond, 1997).

### Regulatory Framework

Although the Ministry of Posts and Telecommunications (MOPT) officially assumed this role in 1995, Bangladesh did not have a regulated Telecom sector until the introduction of the TRC Act in July 2001. The National Telecommunications Policy was passed in 1998, before which The Telegraph Act (1885) and Wireless Act (1933) had been the only governing tools in the sector. However, the BTTB has effectively continued to perform the role of regulator, preventing any significant reforms from taking place in the sector and preventing the growth of the competitive private sector.

### Universal Access

In 1999, Bangladesh numbered among the nations with the lowest teledensity ratings in the Asia Pacific region. At 0.5 %, Bangladesh fares poorly against an average of 8.5% teledensity in Asia Pacific, and 2.8% in South Asia. Although there are no actual measures of access to telephone (as opposed to teledensity) in Bangladesh, a vast majority has little access to affordable and reliable telephony services, and/or access is restricted to basic voice services.

### Fixed Network Development

Within Bangladesh, there are currently only 600,000-fixed line connections, with waiting lists for new lines exceeding several years. As the only major provider of fixed network services at present, the BTTB lacks the necessary resources, incentives and framework for aggressive network expansion. This lack of connectivity has necessarily excluded Bangladesh from the global information revolution and its accompanying benefits.

## Mobile Network Development

The mobile sector in Bangladesh is developing rapidly, with a number of licensed private operators providing service, with funding through private sector equity and debt. Bangladesh's ability to foster growth in this sector sets a precedent for the industry as a whole, but a clearer definition in policy is still required in many critical areas. Currently, the most pressing issue is the lack of universal access (i.e., connectivity to BTTB's fixed line network by mobile phone users) due to a shortage of interconnections to its local and long distance networks. The call traffic of roughly 650,000 mobile users (75% of all mobile users) is, as a result, confined to the four existing mobile networks. The relatively new mobile industry has already overtaken BTTB's market penetration in number of users and continues to grow exponentially; mobile users with universal access increased by only 15% in 2000, while mobile users without such access increased by 359%.

## Convergence

Effectiveness of the proposed policy is overshadowed by the lack of focus on the issue of convergence. The situation would be more complicated soon after the CATV industry diversifies with the Internet and telephony services. A recent study reflects the modest growth of telephony and Internet over CATV networks in the developing economies of Asia. While Bangladesh was not included in this survey, India, Vietnam, Indonesia and Philippines are among the early starters of telephony over CATV, and continue to experience annual growth-rate in the double-digits.

## Internet

Internet usage in Bangladesh has increased rapidly over the last few years. In July 2000, the total bandwidth capacity was estimated at between 100 to 150 mbps, a capacity much below the desired level for an efficient transmission network (TechBangla, 2001). Connection speeds vary between 64 kbps and 2 mbps gateway access. There is a limited scope for digital cable network access for optimal bandwidth and/or broadband services, but only a handful of operators provide these services at present and then only to select areas. Internet access is very limited for reasons such as low teledensity, poor electricity networks, the high cost of computers, and limited knowledge of internet. Public access is limited to a few private telephone centers and cyber cafes, while on a national level, only divisional headquarters and some district towns have access to internet. While there is huge competition among the ISP's, the overall growth of services has been in decline following the deregulation of VSAT by BTTB. Prices have since fallen an average of 140% with average rates now at Tk. 0.45 per minute, and several ISP's are now offering flat monthly rates. Despite a huge reduction in cost, internet services continue to remain unaffordable and inaccessible to the majority of people, including students.

## ICT Education/Training

In the last four years, Bangladesh has experienced a growth of 300% in ICT training institutes, with total investments in training facilities exceeding 2000 million taka. In an effort to address the global boom in ICT education Bangladesh has taken measures to implement computer education at the secondary and higher secondary levels throughout schools in Dhaka. At the 12-university level, all national public universities, particularly the new universities, now have a computer science department and offer degrees in the subject, although with limited scope.

## The Most Crucial Problem: ICT Leadership

The most crucial problem for Bangladesh is the lack of ICT leadership and strategy, both in government and NGO level, which come from the lack of technical knowledge and expertise of senior citizens who are policy makers and top of the society. All ICT service providers in Bangladesh now are focusing predominantly on the city area, not interested in the village, even though 80% of the population of the country lives in villages. All are reluctant with the prejudice that villages are not a profitable region, even though there is a great prospect and need for "Rural Internet" program such as Grameen Phone (Bayes, 1999).

# POTENTIALS OF ICT IN BANGLADESH

## Prospects in Building the Human Resource

Human Resource is the most important component for ICT industry. Bangladesh has a huge educated, unemployed youth force with the ability to read and write in English. The country can take advantage of its immense manpower to train and prepare programmers and ICT professionals. The role of the ICT sector for the national economy is constantly increasing. It is also likely, that

this sector will play a major role in the government and private sector. Thus, perhaps most importantly, this article highlights the significance of carefully selecting the ICT practices that are used in government and private sector the growing population of ICT.

## Healthcare

The main focus in the use of IT and communication technologies in healthcare will be to deliver new capabilities for hospitals and healthcare providers. IT should be used to develop such capabilities specifically in the areas of electronic medical records, telemedicine, and medical and health education.

Telemedicine System Network shall be introduced throughout the country for cost-effective delivery of healthcare services. The Telemedicine Network will be used for rural patient management, distant medical education, training of health professionals and to develop mass awareness for disease prevention. Development of Bangladesh Health Portal should be given priority for appropriate growth of e-health and telemedicine referral system. International tele-consultation through telemedicine for critical patients will be supported in both private and public sector. All public hospitals and medical research centers shall be linked by computer networks with Bangabandhu Sheikh Mujib Medical University as the central hub in order to make expert services available throughout the country. This network may be gradually extended to the Upzila level.

## Education and Skills

The country seeks to produce a large ICT labor force. ICT education will be promoted at all levels. Universities, Bangladesh Institutes of Technology and both public and private colleges will be strengthened to produce graduates with four-year computer science and computer engineering specializations. The government will designate one of the three proposed science and technology universities as a centre of excellence in ICT and give resources to fulfill this position. Furthermore, the country will establish multimedia institutes to make use of the opportunity offered by the growing multimedia market. Public and private education institutes, including polytechnics, will offer diploma and trade courses in ICT. To enhance and upgrade the skills of existing technology professionals, in-service training programs will also be created. As Bangladesh faces a shortage of qualified instructors to teach aspiring ICT in education professionals, the country is introducing IT-Capacity-Building in the Teachers Training Institutes (TTI), intensive post-graduate diplomas and in-service programs. Virtual ICT teachers will be used to fill the current lack of trained instructors, and CD and Web-based courseware will enable computer-aided instruction. A national certification and accreditation system will also be formed, ensuring standardized, quality ICT education (Madhavan, 1999).

## Access to Information and E-Services

E-governance shall use IT system within the public administration to improve efficiency, reduce the wastage of resources, enhance planning, and raise the quality of services. Government shall implement wide-spread IT systems to provide nation wide coverage and access by any citizen to the government databases and administrative systems, which can be used to extend public services to the remotest corner. Promote and facilitate use of IT in all sectors of the economy for transparency, good governance, and efficiency improvement. ICT can also possible to conceive small business ventures at the national and global level that could economic recovery and create new jobs. The development of the national and global information infrastructures networks and the application of the new telemetric technology could now provide the platform fro a national and global resurrection. I would like to refer to the following example where people are getting benefits to use ICT in developing countries:

1. **Case of Madhya Pradesh State of India:** The government is introducing an experimental intranet computer network for government services and local information. This allows citizens to have faster and more transparent access to government services. For example, farmers can get copies of land titles for 10 cents that previously cost as much as U.S. $100 from corrupt officials. Andhra Pradesh in India has also launched Internet-enabled integrated service centers providing access to different types of government services. (Vasanth & Kumaran, 2001).
2. **Case of Andhra Pradesh Citizen Service Centers:** Andhra Pradesh, a state of India, has launched Internet-enabled Integrated Citizen Service Centers. Access to services including bill payments, issuance of certificates, permits and licenses, public information, and administration procedures are provided.

These are merely some of the examples where ICT has been of great service to the socially disadvantaged group, the poor people in the rural areas. There are success stories like these, but there are also many opportunities unexplored (Madhavan, 1999).

## Prospects in Improving the Livelihood

### Rural Economy

Rural economy can be substantially improved with the application of ICT. Farmers can have continued specific advice regarding fertilizers, choice of crops and timing of sowing for their individual plots. They can learn about relevant technology. Growers can know the current prices of vegetables; fruits etc. throughout the country and can make their strategy for timing and place for sale of their products.

The size of Bangladesh's economy is very small while the country has a large population. In the past, hardly anybody took notice of the existence of this country; at times it is not even spotted in the world map because it does not feature as a serious market for buying or selling. All these can change now. Bangladesh can become a familiar name in the world market if it takes advantage of the new technologies, particularly Information and Communication Technologies, which is changing the world dramatically. Stage is already set. In the previous decade the world has just seen the tip of these changes. Next decade will unfold scenarios, which will redefine the lives of people around the world (The World Bank, 1999).

Bangladesh is one of the most densely populated countries in the world. Bangladesh has huge population and more than 80% of this population lives in villages. The vase majority of the rural population is not well educated and most of them are farmers. Agriculture, including fisheries and livestock, is the main source of earnings for the majority of the people of Bangladesh. IT systems can be used in these sectors to reap its unutilized potentials thereby improving the socio-economic conditions of the rural people. Proper initiatives should be taken to utilize IT systems in agro-business development, agriculture research, dissemination of agricultural technology to the farmers and preparation and maintenance of agricultural database. They live hand to mouth and without development of this population Bangladesh can't reach good position. Bangladesh's economy mostly depends on agricultures. (Prof Muhammad Yunus, on April 1, 2001), opined Infect the per capita income of the people could be doubled and the number of the people living below the poverty line could be halved by allowing the free access of information and communication technology. On the other hand, the rural people also can benefit from the use of ICT. The farmer can get information about their products and also can get up-to-date information regarding selling price of their products. (Yunus, 1999)

### Tourism

To harness the potential of the tourism industry in Bangladesh, Information Technology can play an important role. Information Technology should be used to promote tourists' attractions in Bangladesh through the Internet. A reliable, comprehensive, online information system to satisfy the needs of the tourists for travel and accommodation to deliver instant and up-to-date information will be developed. The partnership with both the local and foreign agencies relevant to tourism will be strengthened and encouraged to introduce online reservation for travel and accommodation, booking, and ticketing for arts and entertainment events and shopping.

## FUTURE IMPACT OF ICT ON LABOUR MARKETS

Information and communications technologies (ICTs) have dramatically reshaped labor markets around the world. Social inequality within and between countries has increased and young men and women have tended to bear the brunt of this. The number of unskilled, semi-skilled and entry levels jobs in a wide variety of sectors have declined. Large organizations in both the public and private sectors have shed good number of positions. For young people this has resulted in stubbornly high unemployment levels, in most countries these are locked in at rates many times above national unemployment. ICTs have been extremely important in generating two strongly diverging forces for the Bangladeshi workers. They have contributed to the automation of processes making some workers redundant and closing off jobs many young people could have expected to begin their careers; and changed the economics of many sectors reducing the importance of scale, so facilitating an upsurge in employment in small, medium, and micro enterprises (SMMEs). Where young people, with the benefit of a good education and training foundation, could have once expected to have a job for life this is no longer the case. But if that education and training is in ICT-related skills, and if they demonstrate enterprise and resourcefulness there are vast opportunities in Bangladesh (World Bank, 1999).

## FUTURE TRENDS

Bangladesh is still a developing country and has to go a long way to have a good economic position in the world map. As I mentioned earlier, Bangladesh economy depends on agricultures sector. Most of the population,

nearly 80%, lives in villages. Without improvement of the rural economy, healthcare, government sector, human resource, and tourism, Bangladesh cannot go far. This scenario has been changing from the early 1990s. The government of Bangladesh has realized that ICT has good potentials to improve Bangladesh economy. The government of Bangladesh has taken some important initiatives to develop the IT sector. Some noteworthy steps of the government are the following:

- IT has been declared as a thrust sector.
- Quick implementation of the recommendations of Joint Review Commission's (JRC) report (a high powered committee for software export).
- Waiving all taxes and duties from import of computer hardware and software.
- Hundred percent remittances of profit and capital gains for foreign investors without any approval.
- BTTB's implementation of digital divided network (DDN) service.
- Decision to link Bangladesh to global highway through submarine cable. Bangladesh has been linked with global highway through submarine cable by December 2005.

## CONCLUSION

The government shall use ICT systems within the public administration to improve efficiency, reduce the wastage of resources, enhance planning, and raise the quality of services. Government shall implement widespread ICT systems to provide nation wide coverage and access by any citizen to the government databases and administrative systems, which can be used to extend public services to the remotest corner. Bangladesh has a long way to go in a very short time to enjoy the fruits of ICT and the information age. It will only be possible when there will be thorough effective approaches of ICT interventions can be made available to the grass root level of the communities in this region, which ultimately would bring better governance through propagation of information at ease with improved access to the stakeholders.

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## KEY TERMS

**Bangladesh Telegraphs and Telephone Board (BTTB):** At this moment, BTTB is providing basic telecommunication services through out the country and also providing carriers to communicate with the outside world. BTTB is also providing some value added services as dial-up and leased line Internet services, international private leased circuit (IPLC) services, digital subscribers line (DSL), telex services and packet switch data network (PSDN) services.

**CATV:** Originally "community antenna television," now often "community access television," but more commonly known as "cable TV." In addition to bringing television programs to those millions of people throughout the world who are connected to a community antenna, is an increasingly popular way to interact with the World Wide Web and other new forms of multimedia information and entertainment services.

**E-Development:** Refers to development policy and activities of the third world countries in which ICTs has a key role to play.

**Grameen Phone (GP):** The leading cell phone company in Bangladesh.

**Joint Review Commission (JRC):** A high-powered committee for software exports under Prime Minister's Office.

**Ministry of Posts and Telecommunications (MOPT):** A policy-making institution of the government regarding administration and development of posts and telecommunications. It also formulates laws, rules and regulations for the management and administration of posts and telecommunications

**National ICT Task Force:** A committee formed by the government of Bangladesh headed by the prime minister. This committee is entrusted to the development of Bangladesh ICT infrastructures and has exclusive power to establish and provide all ICT services and products.

**SMME:** Refers to small, medium, and micro enterprises.

**Telemedicine:** Refers to people's chances to communicate with doctor via telephone or over the Internet.

**Teledensity:** The number of landline telephones in use for every 100 individuals living within an area. A teledensity greater than 100 means there are more telephones than people. Third-world countries may have a teledensity of less than 10.

**Telegraph Act:** The Ministry of Posts & Telecommunications (MOPT) holds the responsibility of sector regulation. The Telegraph Act of 1985 is the primary law governing the sector and granted the government exclusive power to establish and provide all telecommunications services and products.

**UNCSTD:** Is United Nations Commission on Science and Technology for Development.

**United Nations (UN):** The most important international organization of our time. Its purposes are to maintain international peace and security; to develop friendly relations among nations; to cooperate in solving international economic, social, cultural and humanitarian problems and in promoting respect for human rights and fundamental freedoms; and to be a center for harmonizing the actions of nations in attaining these ends.

**Wireless Act:** The Wireless Telegraphy Act of 1933 governs the operation of one-way Radio Communications, Paging and Radio services. The BTTB Ordinance of 1979 provided BTTB the monopoly rights and powers for issuing license for telecommunications and wireless services.

# E-Enforcement in Digital Government



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## INTRODUCTION

In recent years, there has been a significant rise in "e-enforcement." E-enforcement is the use of electronic tools in law enforcement. In this article, we consider two new forms of e-enforcement which have recently been introduced in Europe. These are Weigh in Motion with Video (WIM-Vid) and the digital tachograph. WIM-Vid is a system involving sensors in the road and cameras in order to register overloading of heavy goods vehicles. WIM-Vid was developed and implemented in the Netherlands and is currently attracting international attention. The digital tachograph replaces the analogue tachograph in all heavy goods vehicles within the European Union. The machine registers drivers' driving and rest times.

In this article, we focus on the special position of the clients of e-enforcement, the regulatees. Although e-enforcement is a form of e-government or digital government, the position of the client is quite distinct. Many definitions describe e-government in terms of service delivery (Chen, 2002; Devadoss, Pan, & Huang, 2002; Finger & Pécaud, 2003; Hiller & Belanger, 2001; Ho, 2002; Moon, 2002). These descriptions feature the concept of customer focus (Devadoss et al., 2002; Finger & Pécaud, 2003; Ho, 2002). The purpose of e-government should be to satisfy these customers, whether they are ordinary citizens or parties in private sector (Finger & Pécaud, 2003). The clients of enforcement, however, are offenders or potential offenders. These clients are characterized by the fact that they do not want the service and generally exhibit uncooperative behaviour (Alford, 2002). They may, for example, actively evade the "service" of enforcement, or commit information fraud (Hawkins, 1984). In this article we will see what the distinct position of the clients of enforcement means for the effects of e-enforcement.

## BACKGROUND

First we summarize the main theories on styles of law enforcement. Then we outline the state of the art in e-enforcement.

### Law Enforcement Theories

In the literature on enforcement, two constituent styles of enforcement are often distinguished (Hawkins, 1984; Hutter, 1997; Sparrow, 2000). The first style is that of "sanctioning," "compulsion," "coercion," or "penalism." This style centers around the idea that the violation of norms must be punished in order to ensure that the regulatee will comply with these norms in the future. Both the rules and the context are unambiguous; the regulatee simply has to obey the rules. Inherent in this approach is a unilateral and hierarchic relationship between inspector and regulatee. The focus is not on the relationship but on enforcing the norm.

The second style is called "compliance," "conciliation," "compromise," and "remedialism." Enforcement is seen as a multilateral process of consultation and negotiation, since inspector and regulatee are dependent on each other. For example, the regulatee may be unaware of technological developments, thereby inviting an educational approach from the inspector. Consultation and negotiation also arise from ambiguity regarding the norm, for example when a rule is contradictory or different rules contradict each other, or when the application of a rule is seen as being unreasonable.

The first style has a binary character. There is a rule and it is either broken or not. If it is broken, the inspector will take action. The second style is serial and incremental in nature (Hawkins, 1984). After all, negotiation is more a process of give and take. Improvements in the behavior of the regulatee will therefore take place gradually. In the first style, supply of information is essential to the inspector: without solid information on the regulatee's behavior, there can be no adequate sanctioning and enforcement. In the second style, information is important, of course, but interaction also plays a crucial role: good enforcement is strongly dependent on the quality of the relationship between inspector and regulatee. The regulatee fulfils the role of "obligatee" (Alford, 2002). It is therefore not self-evident that he will behave in accordance with the norm. In many cases, he will behave strategically and act as an opposing player in relation to the inspector (McBarnet & Whelan, 1999).

## E-Enforcement State of the Art

E-enforcement is the use of electronic tools in law enforcement. It is a form of digital government. "E-enforcement" is an abbreviation for "electronic enforcement" (Smith, McFadden, & Passetti, 2000) and is synonymous with "automated enforcement" (Retting & Williams, 1996; Smith et al., 2000; Turner & Polk, 1998; Wilmot & Khanal, 1999; Wissinger, Hummer, & Milazzo, 2000).

There is only a limited number of e-government and digital government publications that mention the area of regulation and law enforcement (Chen, 2002; Chen, Schroeder, & Hauck, 2002; Strejcek & Theil, 2002). Also, the e-government applications involved all concern government-to-government interaction (Hiller & Belanger, 2001). In this article, however, we are interested in the relationship between government and businesses or citizens. Critical publications on this type of e-government can be found in the literature on automated traffic enforcement.

The literature on automated traffic enforcement discusses the use of electronic tools for the enforcement of laws against speeding (Glauz, 1998; Perone, 1998; Wilmot & Khanal, 1999), running red lights (Ruby & Hobeika, 2003; Walter, 1998), entering railway crossings when gates are down (Meadow, 1998), failing to pay tolls and high-occupancy vehicle lane violations, electronic toll collection systems, vehicle inspection, weigh-in-motion stations and remote emission sensing (Bartoskewitz, Carson, & Curry, 1999; Bochner, 1998; Turner & Polk, 1998). Bochner (1998) reports that automated enforcement is used in over 75 countries throughout the world.

Automated traffic enforcement is found to be very effective in reducing violations and ultimately in reducing accidents (Glauz, 1998; Meadow, 1998; Perone, 1998; Ruby & Hobeika, 2003). Some authors mention that motorists may oppose the introduction of automated traffic enforcement by seeking to influence politicians (Bartoskewitz et al., 1999; Turner & Polk, 1998). None of the authors, however, mention or investigate opposition or strategic behavior among inspectees after the definitive introduction of the systems. It is this type of opposition which forms the focus of this article.

## TWO CASES ON E-ENFORCEMENT

For both cases, we outline the original method of enforcement and the method of e-enforcement. The complete case study descriptions including source references and description of the research method can be found in Koopmans-van Berlo (2003) and Koopmans-van Berlo & de Bruijn (2004).

## Weigh in Motion with Video

Overloading of heavy goods vehicles can take two forms. The vehicle as a whole can be overloaded or there is an excessive load on one of the axles. Both types of overloading cause damage to roads and dangerous situations. As overloading represents a form of unfair competition, both types of overloading are liable to punishment as an economic offense.

### Original Enforcement

Before the electronic enforcement system was available, inspectors and police conducted incidental checks at the roadside. Motorcycle brigades halted heavy goods vehicles on the road and led them to a parking space at the side of the road. The vehicles were selected by their appearance. Trailers with a large bulge on top or with sagging axles stood a good chance of being stopped and weighed, as did vehicles from haulage companies with a bad reputation or transport flows where there was a tendency towards overloading.

Once a driver had been led to the side of the road, he was required to drive his vehicle slowly onto a weighing platform and to stop at each axle. The weighing platform determined the load on the axles. If overloading was discovered, an official report was written out.

### E-Enforcement

A definition of "weigh in motion" is "the process of estimating the total weight of a moving vehicle and the part of that weight carried by each wheel, each axle or axle group or a combination thereof, by measuring and analyzing the dynamic tyre forces of the vehicle" (Katz & Rakha, 2002). An innovative application based on the WIM system has recently been developed in Europe, by linking it with cameras (WIM-Vid, video) and registration databases.

Induction loops are placed in the road to register the passage of traveling vehicles, along with sensors which record the axle configuration and the axle loads. The axle configuration indicates the type of vehicle, thereby specifying the norms which apply to it. Cameras above and beside the road photograph the registration number, time of violation, the hazardous-substances sign and the vehicle as a whole. An infrared camera is also in place for night photographs. All passing heavy goods vehicles are monitored 24 hours a day. The measuring points are indicated by road signs.

Enforcement officers can watch the images of overloaded heavy goods vehicles in real time, either on loca-

tion or remote. The data from the WIM-Vid system are automatically linked to the registration data of the RDW Centre for Vehicle Technology and Information, thereby connecting the information about the violation with the company name of the offending vehicle. From a legal perspective, only the weighing of vehicles using special (mobile) weighing platforms can provide valid evidence. Imposing sanctions in the event of an actual violation therefore requires that the measuring points be manned. WIM-Vid is used to select violators, who are subsequently checked for overloading using a weighing platform. Violators checked by the manning teams have to remedy the violation at the spot and always receive a penalty.

## The Digital Tachograph

Tired drivers drive less safely. This is the reason behind the existence of legislation governing driving and rest times for the drivers of buses and heavy goods vehicles. Violating these rules is an economic offence.

### Original Enforcement

A tachograph is a mandatory piece of equipment in heavy goods vehicles which registers the driving and rest times of the drivers. From 1975 until the present day, this machine has been analogue.

Drivers are obliged to insert a paper disc into the machine during their shift. A sensor in the gearbox measures the speed of the vehicle and the distance traveled, while a pen traces these details on the layer of wax on the paper disc. A driver takes his paper disc with him when he changes vehicle and while working he is required to carry his discs from the last eight days with him. The company is required to keep all of its drivers' discs on file for one year.

The Transport and Water Inspectorate conducts inspections on the roads and at companies. During the roadside checks, the enforcing officer asks the driver to produce his tachograph paper discs and he reads manually whether that driver has taken enough breaks and sufficient rest.

A company visit is only carried out if violations are suspected, for example on the basis of roadside inspections. Companies are required to store their drivers' tachograph paper discs for one year. During a company visit, the inspector takes away with him the pile of tachograph discs from the previous year. The discs are inspected by scanning them one by one in a computer program, which is able to detect violations. Companies are sometimes asked to submit their paper discs to the inspectorate on a voluntary basis.

### E-Enforcement

In 1997, the European Union Transport Council decided on the mandatory introduction of the digital tachograph. The planned date for introduction is August 2005. The digital tachograph is a piece of equipment that will be built into every heavy goods vehicle or bus. As with the analogue tachograph, the basis is a "motion sensor" in the gearbox and also the digital tachograph registers speed and distance and links these to date and time.

In order to link the data to a person, there is a driver's personal smart card. When a driver changes vehicle, he takes the smart card with him and inserts it into the tachograph of the next vehicle. The tachograph writes on the driver's smart card and to its own memory. If a driver should drive without a smart card, the tachograph will still register the data in its own memory, but without linking them to a name. The data are stored for 28 days on the driver's smart card and one year on the tachograph's memory. Each inspector has his own smart card. When he inserts this into the tachograph during a roadside inspection, he can download all the data from the tachograph's memory.

The company has special company smart cards. These allow the data from all the vehicles' hard disks to be downloaded to a company computer. Companies are obliged to store all data in one central file for one year. At a company visit, the inspector can view the entire database. In future the Transport and Water Inspectorate would like to see the companies submit their data to the Inspectorate a mandatory basis. Lastly, there are workshop smart cards. Each workshop with a permit to install digital tachographs has a smart card which allows full access to the tachograph (Anderson, 1998, 2001).

## CRITICAL ISSUES AND DILEMMAS

What we see in the case studies is that e-enforcement leads to better information, resulting in improved ways of working. Unfortunately the positive aspects are undermined by opposition or strategic behavior on the side of the regulatees.

## E-Enforcement Does Lead to Better Information

### Better Operational Information Improves Efficiency

In both case studies, the introduction of e-enforcement results in better operational information, while the effi-

ciency of information gathering also improves. Enforcement of the rules regarding overloading was originally carried out by means of incidental checks, but thanks to WIM-Vid checks can now be carried out at measuring points 24 hours a day. Where inspectors only used to have access to data on the heavy goods vehicles they pulled off the road, they now have data from all passing trucks. WIM-Vid therefore provides an overall impression of the entire haulage sector. This is beneficial to the quality of the information available to the inspector. The previous tendency of some inspectors to more or less ignore certain types of transport illustrates this point well. Before the introduction of WIM-Vid, these inspectors estimated that certain types of transport were hardly every guilty of overloading, based on their professional "tacit knowledge." The introduction of WIM-Vid was a revelation in this regard. Overloading turned out to be very much an issue in these types of transport.

A similar situation applies to the digital tachograph. The enforcement capacity can be deployed far more effectively and the quality of the information increases as a result. For example, the inspector can read the machine in the vehicle using a pocket computer. In the analogue system, the inspector had to read and interpret the paper disc manually. This was a complex task, which required a practiced eye. The digital tachograph stores the data of individual drivers for 28 days, instead of eight days. A company inspection can be completed more quickly thanks to the digital tachograph. Where inspectors originally had to work their way through a huge pile of paper discs, they now have all the data presented to them in one central file.

## E-Enforcement Provides Possibilities for Recognizing Patterns

A second observation is that e-enforcement leads to more advanced "intelligence." Because they store information on a large scale, both instruments make it possible to recognize patterns of behaviours. With both WIM-Vid and the digital tachograph it is possible to recognize patterns at company level. Which companies are frequent offenders, for which companies is violation incidental? This is possible because WIM-Vid automatically traces which company is responsible for the violation via the license plate and ranks the company dossiers from major to minor offenders.

The new technology also creates the possibility of pattern recognition according to type of violation. The introduction of WIM-Vid has led to the insight that 70% of cases of overloading concern the overloading of one axle (mostly the front axle). The main problem is not that drivers transport too much, but that the load is incorrectly distributed. Other examples of pattern recognition are the categorization of overloading according to type of vehicle, time of the offence, location of the offence, the vehicle's place of origin and according to whether or not the load contains hazardous substances. Categorization of this type subsequently influences enforcement. Once categories are visible, the inspector can target checks more specifically towards certain groups, times, locations and types of activity.

The possibilities of pattern recognition have consequences for the way in which the inspectors work. They shift the focus from the individual driver to the companies. Companies guilty of multiple violations are visited and confronted with the patterns detected. In addition to the tit-for-tat penalties resulting from enforcement at the measuring points, agreements can be made with the offending companies with the aim of achieving more structural solutions. The inspectors report that haulage companies carried out extensive adjustments to their fleets during the pilot studies. These technical solutions included fitting an extra axle to a vehicle, fitting a side loading door or fitting measurement sensors to help prevent axle overload.

The digital tachograph also offers opportunities for shifting the enforcement from individual to company level. Following introduction of the digital tachograph, the Inspectorate of Transport, Public Works, and Water Management is optimistic about the prospect of preselecting companies for in-company investigation, on the basis of data submitted. With the old tachograph this could only occur to a limited extent and on a voluntary basis (the inspector was dependent on the companies' willingness to submit the paper discs).

## But Opposition may Undermine the Positive Effects

The picture we have outlined so far would appear to strengthen the position of the inspectors. They have more operational information and more possibilities for pattern recognition at their disposal. In this way, e-enforcement offers the opportunity for an almost watertight control of the regulatee and for zero tolerance enforcement. However, the paradox of e-enforcement is that the power of 100% control is also its Achilles heel. E-enforcement results in binary and watertight control and assumes an enforcement context that is clear and free from ambiguity. The latter has proven not to be the case, however, and binary enforcement in an ambiguous context can lead to a loss of legitimacy.

## The Legitimacy of the Rules Comes Under Discussion

WIM-Vid shows that the majority of violations involve only one axle as a result of the way in which the truck is loaded. Regulatees are therefore not overloaded as such, but are only carrying too much weight on one axle. Many consider it unfair to strictly enforce single-axle overloading as an economic offence. After all the reasons for the overloading are not economic but technical. It is not possible to find a technical solution for single-axle overload for every type of heavy goods vehicle. The alternative would be that the drivers have to transport less freight, a solution that has major financial implications for the transporters. This raises the question whether a single-axle violation is serious enough to justify imposing such a sizeable loss of income on the offending company. Before WIM-Vid was introduced, single-axle overloading was hardly ever enforced. When this began to happen following the introduction of WIM-Vid, the sector argued in favor of a transitional period to allow companies to purchase models less susceptible to overloading when they bought new vehicles, instead of having to invest in expensive adjustments to existing vehicles. However, the government rejected this idea, its argument being that single-axle overloading had always been against the law, even if it was seldom enforced.

The digital tachograph shows violations of driving and rest times. However, there are many different kinds and degrees of violation. A driver who has been caught up in a long tailback abroad and who can still deliver his perishable load on time if he drives for an extra 30 minutes will likely do so without much hesitation, even if it does mean breaking the rules. It might also be the case that a driver is willing to take a break but cannot find a parking space. Violations of this kind, accompanied by mitigating circumstances, differ from violations that are committed deliberately.

In both cases, a binary attitude by the inspector—either a violation that must be penalized or not a violation—can be counterproductive. The legitimacy of the sanction becomes a matter for dispute. If the sanction is imposed regardless of such considerations, this can erode the legitimacy of the underlying rules. Once this has occurred, it drives out the regulatee's moral motivation for obeying the rules and it is conceivable that the sector will simply adapt its prices to cover any additional costs due to sanctions. In the haulage sector, such behavior can indeed be seen. Fines sometimes form part of a firm's budget calculations in advance.

## Strategic Behavior Remains Possible

The previous section brings us to one last observation. When the legitimacy of the rules is contested, this gives rise to strong incentives for strategic behavior. When a company or large parts of a sector engage in strategic behavior, the potential effect is large:

- Where the digital tachograph is concerned, a major risk is associated with the workshop smart cards. Workshop mechanics can use these smart cards to alter the settings of the digital tachograph. The history of analogue tachographs has shown that workshops were bribed into tampering with the machine. The bribing of workshops and the development of a black market in workshop smart cards could lead to digital tachograph fraud on a large scale. This is what Anderson expects will happen (Anderson, 1998, 2001).
- It also seems like an attractive proposition to find a way of manipulating the centrally downloaded data from all drivers in the company computer. These are the data that inspectors check during a company visit. The data are very well protected, but can we be sure that fraudsters will not eventually find a way to outsmart the technology? If they were to succeed in breaking through the security, the risk of fraud spreading is greater with digital technology than it was with analogue technology.
- WIM-Vid would also appear to be susceptible to strategic behavior at collective level. Half an hour after a measuring point is manned, the number of overloaded vehicles drops dramatically. After two hours there are almost no overloads at all. The inspectors think this is because the drivers communicate with each other and either take an alternative route or stop their trucks. This behavior also occurred before e-enforcement was introduced. These options for strategic behavior cast a different light on another observation. Companies that have received visits can no longer be found in the violation statistics afterwards. This could be because they now stick to the rules. But given the possibilities for strategic behavior, there is also the chance that they structurally avoid measuring points.

It has to be concluded that possibilities for strategic behavior do exist. The question of whether this strategic behavior actually occurs is difficult to investigate. After all, it is very much in the regulatee's best interests to conceal such strategies. However, we can conclude that

there are strong incentives for strategic behavior and that there are possibilities, technical and otherwise, for strategic behavior.

## FUTURE TRENDS

It is likely that the use of e-enforcement will increase in future. We see that the forms of e-enforcement grow more complex. The first applications as mentioned in the literature review (for example cameras against speeding, red light running, and entering railway crossings when gates are down) share some characteristics. They are based on only one variable concerning behavior, speed, or crossing, which is unambiguous and valid for all types of vehicles. The more recent applications, WIM-Vid and the digital tachograph, make calculations based on various variables, which differ for types of vehicles. They do not only automize the observation by humans, but enable new and more intelligent ways of working. They lead to aggregate information, patterns, and new insights about regulatees and violations. We expect e-enforcement to change enforcement radically. It is therefore very important to investigate not only the technological aspects of e-enforcement, but also the implications for new ways of working, in order to prevent the rise of opposition.

## CONCLUSION

The analysis given above provides us with an ambivalent impression of e-enforcement. First appearances would suggest that there has been a strong improvement in enforcement. By digitizing the information function, better and more reliable information can be obtained. This is beneficial in terms of the effectiveness and efficiency of the enforcement. New working methods also appear. Pattern recognition becomes possible and shift the focus from the individual driver to the companies.

A second look reveals some less positive aspects. Thanks to e-enforcement, the inspector has possibilities at his disposal for being able to enforce zero tolerance at operational level. Thanks to pattern recognition, e-enforcement also offers the possibility of reaching collective agreements with companies. But this process of interaction will be significantly disrupted if companies dispute the legitimacy of the rules and this legitimacy is partly eroded by the binary, zero tolerance type approach made possible by e-enforcement. Furthermore, e-enforcement can thereby create incentives for collective strategic behavior. The greater the controversy surrounding the rule or how it is applied, the less reservations companies will have in practicing such strategic behavior.

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## KEY TERMS

**Digital Tachograph:** Digital machine in a heavy goods vehicle that registers a driver's driving and rest times.

**E-Enforcement:** The use of electronic tools in law enforcement.

**Law Enforcement:** All actions aimed at achieving behavior that conforms to the norm.

**Regulatee:** A person subject to enforcement.

**Strategic Behavior:** Behavior in one's own interests that frustrates the interests of an opponent.

**Weigh in Motion:** The process of estimating the total weight of a moving vehicle and the part of that weight borne by each wheel, each axle or group of axles or a combination thereof by measuring and analyzing the dynamic tyre forces of the vehicle

**Zero Tolerance:** Very strict law enforcement.

# E-Government Act of 2002 in the United States

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## INTRODUCTION

The United States is frequently ranked among the most advanced e-government countries in the world (Accenture, 2004; United Nations, 2003; West, 2004). While many of these surveys emphasize the importance of technological issues, such as Web sites, interoperable data standards, and security protections, considerably less attention has been focused on the legislative environment that either facilitates or hinders the development of e-government at the national level. Like all countries, the United States has long grappled with the problem of how to centrally coordinate a diverse and sometimes incongruous collection of departments and agencies to achieve improved efficiencies, while maintaining a level of flexibility that enables these entities to carry out their specialized responsibilities effectively. This challenge can be made harder by the integration of information technology into government, by reifying organizational boundaries in the form of so-called "stove pipes" and "islands of automation." To combat these problems, national governments are attempting to use legislative means to harmonize a cacophony of independent initiatives, and establish benchmarks for oversight.

On December 17, 2002, President George W. Bush signed the E-Government Act of 2002 (116 Stat. 2899; P.L. 107-347) into law. Although there are many existing laws regarding issues such as information technology (IT) management, privacy, and information security, the E-Government Act of 2002 is the first national law that specifically addresses e-government in the United States. Prior to the passage of the E-Government Act, the law frequently cited as the most comprehensive information technology-related law was the Clinger-Cohen Act, signed into law in 1996, just 5 years after the development of the World Wide Web (1991) and at a time when the potential uses of the Internet were just beginning to be recognized by the larger, general public. The Clinger-Cohen Act provisions focus primarily on a narrow range of issues, including the decentralization of IT management within the U.S. federal government, pilot testing of new IT procurement procedures, and the establishment of chief information officer (CIO) positions in the major departments and agencies. In contrast, the provisions of the E-Government Act, described in greater detail below, address a much more comprehensive range of issues, suggesting that the integration of IT into government operations has reached a critical turning point. Some of these provisions include information security, IT management and training, the digital divide, and the creation of an Office of Electronic Government to coordinate and oversee e-government initiatives government-wide, among other duties.

## STATUTORY INTENT AND HISTORY

The E-Government Act of 2002 was enacted to enhance access to government information and the delivery of information and services to citizens, employees, and other agencies and entities (U.S. Congress, 2002). To meet this goal, the statute authorizes $345 million over 4 years for e-government initiatives. It also assigns considerable influence to the Office of Management and Budget (OMB) to ensure that information technology investments throughout the federal government embrace a citizen-centered, cross-agency, and performance-based strategy.

As defined in the statute, *e-government* refers to "the use by Government of web-based Internet applications and other information technologies, combined with processes that implement these technologies, to (A) enhance the access to and delivery of Government information and services to the public, other agencies, and other Government entities; or (B) bring about improvements in Government operations that may include effectiveness, efficiency, service quality, or transformation" (116 Stat. 2902). Both the term and the concept of e-government are relatively new in government parlance. The phrase appeared, without explanation, in the initial September 7, 1993, report of the National Performance Review (NPR) (Office of the Vice President, 1993, p. 112). A joint report of the NPR and the Government Information Technology Services Board, issued on February 3, 1997, gave the term

more prominence and substance (Office of the Vice President, 1997). Almost 3 years later, in a December 17, 1999, memorandum to the heads of executive departments and agencies, President Bill Clinton directed these officials to take certain actions in furtherance of "electronic government" (U.S. NARA, 2001, p. 2317).

President George W. Bush indicated his support for e-government initiatives early in his administration when he proposed the creation of an e-government fund. In advance of his proposed budget for FY2002, the President released, on February 28, 2001, *A Blueprint for New Beginnings: A Responsible Budget for America's Priorities*. Introduced as a 10-year budget plan, the *Blueprint*, among other innovations, proposed the establishment of an electronic government account, seeded with "$10 million in 2002 as the first installment of a fund that will grow to a total of $100 million over three years to support interagency electronic Government (e-gov) initiatives." Managed by OMB, the fund was foreseen as supporting "projects that operate across agency boundaries," facilitating "the development of a Public Key Infrastructure to implement digital signatures that are accepted across agencies for secure online communications," and furthering "the Administration's ability to implement the Government Paperwork Elimination Act of 1998, which calls upon agencies to provide the public with optional use and acceptance of electronic information, services and signatures, when practicable, by October 2003" (U.S. Executive Office of the President, Office of Management and Budget [OMB], 2001a, pp. 179-180). About 1 month later, on March 22, OMB announced that the Bush administration recommended doubling the amount to be allocated to the e-government fund, bringing it to $20 million. House appropriators, however, were particularly reluctant to provide more than a quarter of the amount sought by the President. While expressing general support for the purposes of the fund, they also recommended that the administration work with the House Committee on Government Reform and the Senate Committee on Governmental Affairs to clarify the status of its authorization. The E-Government Act establishes an E-Government Fund in the Treasury of the United States with specific levels of appropriations authorized through FY2006 and "such sums as are necessary for fiscal year 2007" (116 Stat. 2908).

Pursuant to an OMB Memorandum of July 18, 2001, an E-Government Task Force was established to create a strategy for achieving the e-government goals of the Bush administration. It subsequently identified 23 interagency initiatives designed to better integrate agency operations and IT investments. These initiatives, sometimes referred to as the Quicksilver projects, were grouped into five categories: government to citizen, government to government, government to business, internal efficiency and effectiveness, and addressing cross-cutting barriers to e-government success. Examples of these initiatives included an E-Authentication project, led by the General Services Administration to increase the use of digital signatures; the eligibility assistance online project (also referred to as GovBenefits.gov), led by the Department of Labor to create a common access point for information regarding government benefits available to citizens; and the Small Business Administration's One-Stop Business Compliance project (later renamed Business Gateway), designed to help businesses navigate legal and regulatory requirements. An additional initiative, a government-wide payroll process project, was subsequently added by the President's Management Council. In 2002, the E-Clearance initiative, originally included as part of the Enterprise Human Resources Integration project, was established as a separate project, for a total of 25 initiatives (U.S. General Accounting Office [GAO], 2002, 2003a). These projects became part of the *President's Management Agenda—FY2002*, submitted to Congress in August 2001 and featuring five interrelated government-wide initiatives: Strategic Management of Human Capital, Competitive Sourcing, Improved Financial Performance, Expanded Electronic Government, and Budget and Performance Integration (OMB, 2001b).

After the Clinger-Cohen Act of 1996, the E-Government Act takes the next step to improve IT investment and management, requiring OMB to provide a report to Congress annually on the status of e-government. Rather than simply identifying and reporting IT investment at each agency, the statute appears to have engendered a cultural change in IT procurement, from consolidating and integrating IT investments to encouraging performance-based, citizen-centered, cross-agency planning. The statute designates OMB as the lead organization for all federal executive branch IT purchasing and planning, and all federal executive branch agencies must comply with OMB guidance to ensure implementation of e-government.

## MAJOR PROVISIONS

The E-Government Act is organized in five titles containing sections which amend various titles of the *United States Code*. Title I of the statute, denominated Office of Management and Budget Electronic Government Services, amends Title 44, *United States Code*, with a new Chapter 36 on Management and Promotion of Electronic Government Services. In addition to defining key terms, Title I establishes an Office of Electronic Government within OMB, headed by an administrator, who is appointed by the President without Senate confirmation. The administrator assists the director of OMB with all functions assigned in Chapter 36, as well as those as-

signed to the director by Title II of the statute, and "other electronic government initiatives." The administrator is also responsible for assisting the OMB director, deputy director for Management, and administrator of the Office of Information and Regulatory Affairs "in setting strategic direction for implementing electronic Government" relevant to certain specified statutory authorities.

Title I of the statute also establishes a Chief Information Officers Council, chaired by the OMB deputy director for Management and composed largely of department and agency chief information officers. The council plays an advisory and coordination role. Other features of Title I are creation of the E-Government Fund to support e-government projects; establishment of a government-wide program "to encourage contractor innovation and excellence in facilitating the development and enhancement of electronic Government services and processes"; and mandating an annual e-government status report by the OMB director to Congress.

Title II of the statute, pertaining to Federal Management and Promotion of Electronic Government Services, specifies the responsibilities of agency heads regarding electronic government; mandates interoperable implementation of electronic signatures for appropriately secure electronic transactions with government; prescribes criteria for maintaining and promoting an integrated federal Internet portal; promotes individual federal court Web sites and agency use of IT to increase access, accountability, transparency, and public participation in the development and issuance of regulations; fosters improvements in the methods by which government information, including information on the Internet, is organized, preserved, and made accessible to the public; establishes privacy impact assessments for agencies when developing or procuring IT that collects, maintains, or disseminates personally identifiable information or when initiating a new collection of such information; and creates a federal workforce skills development program for using IT to deliver government information and services.

Title II also amends Subpart B of Part III of Title 5, *United States Code*, with a new Chapter 37 mandating an Information Technology Exchange Program, facilitating temporary assignments of federal employees to private sector organizations and of private sector employees to federal agencies to enhance IT skills. Other provisions mandate studies and evaluations of (1) community technology centers, public libraries, and other institutions providing computer and Internet access to the public; (2) the use of IT to enhance crisis preparedness, response, and consequence management of natural and man-made disasters; and (3) disparities in Internet access for online government services. Another provision tasks the administrator of general services with making a coordinated effort to "facilitate the development of common protocols for the development, acquisition, maintenance, distribution, and application of geographic information."

Title III of the statute, denominated the Federal Information Security Management Act of 2002, amends Chapter 35 of Title 44, *United States Code*, with a new Subchapter III on information security. It supersedes similar provisions found in Subtitle C of Title II of the Homeland Security Act of 2002 (116 Stat. 2135, at 2155). Excepting national security systems, Subchapter III prescribes a comprehensive program, under the direction of the OMB director, for ensuring the effectiveness of information security controls over information resources that support federal operations and assets. Covered agencies are required to have performed annually an evaluation of the effectiveness of their information security program and practices.

Title IV authorizes generally, unless otherwise specified elsewhere in the act, "such sums as are necessary" to carry out Titles I and II for FY2003–FY2007.

Title V of the statute, denominated the Confidential Information Protection and Statistical Efficiency Act of 2002, vests the OMB director with responsibility for coordinating and overseeing the confidentiality and disclosure policies established by the title. Subtitle A prescribes limitations on the use and disclosure of statistical data or information, and sets fines and penalties for violations of these limitations. Subtitle B, after identifying the Bureau of the Census, Bureau of Economic Analysis, and Bureau of Labor Statistics, as "designated statistical agencies," prescribes the responsibilities, as well as the business data-sharing ground rules and limitations, of these agencies.

## DISCUSSION

Compared to e-government legislation in some other countries, the U.S. E-Government Act is expansive and far reaching, reflecting an attempt to coordinate a sprawling array of individual projects while also capitalizing on broader changes taking place in the public sector in which governments are moving toward a model of governance that Goldsmith and Eggers (2004, p. 10) call "governing by network." Building upon the Clinger-Cohen Act, which is more modest in scope, the E-Government Act serves as the primary legislative vehicle to guide evolving federal information technology management practices by creating new administrative entities, standardizing policies and practices across intergovernmental lines, codifying both public-private partnerships and intragovernmental relationships, and promoting a variety of initiatives to make government information and services available online. In doing so, it also represents a continuation of efforts to realize greater efficien-

cies and reduce redundancies through improved intergovernmental coordination, and by aligning information technology investments. In addition, while the Bush administration's Quicksilver initiatives are separate from the E-Government Act, some of the goals of the Quicksilver initiatives are reinforced by the Act's provisions. For example, Section 216 addresses the development of common protocols for geographic information systems, which is also one of the objectives of the Geospatial One-Stop project (http://www.geo-one-stop.gov/). Section 203 directs agencies to adopt electronic signature methods. Likewise, the E-Authentication initiative strives to develop a government-wide approach to electronic identity systems (http://www.cio.gov/eauthentication/). In addition, some of the Act's broader provisions, such as those related to the development of privacy guidelines, information security standards, and the identification of means to bridge disparities in Internet access among citizens, contribute to the technological and regulatory infrastructure needed to support e-government generally.

However, while the law is still relatively new, the rapid pace of technological change and the drive to implement initiatives in a timely manner have raised a number of implementation issues that may arise during congressional oversight. One of these issues involves the recruitment and retention of IT managers, at both the CIO and project manager levels. As IT projects have become more integrated into the function of a department or agency, the role of CIOs has evolved as well. CIOs are reportedly being called upon not only for their technological expertise, but also to provide strategic leadership in the areas of policy, budget, and contract oversight (Webb, 2003). The CIO's relationship with top-level department decision makers can also be critical to successfully implementing e-government initiatives. This suggests that in selecting a department-level CIO, one needs to consider the strengths and weaknesses of choosing a career employee, who may have a deeper contextual understanding of the mission and functions of an organization, and recruiting a candidate from the private sector, who may bring a wider range of experiences and perspectives to the position (Michael, 2003a). Similarly, the increased size and complexity of IT projects has further underscored the need for strong project managers to carry out these initiatives. While it is not uncommon for IT project management to be just one of several duties assigned to an individual, some observers have suggested that IT projects with budgets of $5 million or larger should have dedicated, full-time managers. The possibility of requiring federal IT project managers to obtain some form of professional certification has also been raised (Michael, 2003b, p. 28; Michael, 2003c).

Another issue concerns information security. In a series of evaluations published since 1997, the General Accounting Office (GAO) has repeatedly reported that the largest federal agencies have made only limited progress in addressing computer security vulnerabilities, citing information security as a government-wide high-risk issue. Specifically, GAO has identified six areas of weaknesses: lack of senior management attention to information security; inadequate accountability for job and program performance related to IT security; limited security training for general users, IT professionals, and security professionals; inadequate integration of security into the capital planning and investment control process; poor security for contractor-provided services; and limited capability to detect, report, and share information on vulnerabilities or to detect intrusions, suspected intrusions, or virus infections (GAO, 2003b, p. 8). For e-government activities, service continuity is considered critical, not only for the availability and delivery of services, but also to build citizen confidence and trust. The risks of fraud and misuse of sensitive data are concerns, as well. Heightened concerns about homeland security and critical infrastructure protection have also drawn attention to the role of information security. The inclusion of Title III of the E-Government Act (referred to as the Federal Information Security Management Act) permanently reauthorizes and amends the Government Information Security Reform Act (GISRA), providing additional means for congressional overseers to assess this issue.

A third issue is the interoperability of technology. Interoperability refers to the ability of a computer system or data to work with other systems or data using common standards or processes. Interoperability is an important part of the larger efforts to improve interagency collaboration and information sharing through e-government and homeland security initiatives. It also represents a significant challenge as the federal government implements cross-agency initiatives, such as the E-Payroll and GovBenefits.gov projects, to eliminate redundant systems and facilitate a "one-stop service delivery" approach to e-government (OMB, 2003, p. 9). One means being used to address this issue is the development of a federal enterprise architecture, at the Web site http://www.feapmo.gov/. An enterprise architecture serves as a blueprint of the business functions of an organization, and the technology used to carry out these functions. While this blueprint is still in its early stages, federal agencies are being required to justify their IT investments based partly on their ability to make a strong business case to support each request, and based on how closely the project aligns with the federal enterprise architecture. Decisions made early in the development of the federal enterprise architecture can have significant implications for future IT projects, suggesting that regular assessments of this process may be necessary to help minimize any potential complications.

Other issues include, but are not limited to, balancing the sometimes competing demands of e-government and homeland security, measuring e-government performance, assessing and monitoring the quality of agency IT project "business cases," and balancing cross-agency funding approaches with oversight interests.

## CONCLUSION

The U.S. E-Government Act represents one example of a country's attempt to harness the transformational potential of e-government. To a certain degree, by virtue of its broad scope and diverse provisions, the E-Government Act suffers from some of the same problems that it was designed to address. With many of its provisions still in the early-to-middle stages of implementation, a number of significant technological and organizational obstacles remain. However, the E-Government Act, in conjunction with executive branch initiatives, such as those related to the development of a federal enterprise architecture, has advanced e-government considerably in the United States. Some of the accomplishments include increased government delivery of government information and services online, improved collaboration between departments, and a greater emphasis on information security. Future effects of the E-Government Act will depend upon ongoing implementation efforts, as well as the degree of oversight exercised by the national legislature.

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## KEY TERMS

**Chief Information Officer:** The senior decision maker in an organization responsible for providing leadership and management of the information technology resources used to support the organization's operations.

**Electronic Government:** The use by government of Web-based Internet applications and other information technologies, combined with processes that implement these technologies, to (A) enhance the access to and delivery of government information and services to the public, other agencies, and other government entities; or (B) bring about improvements in government operations that may include effectiveness, efficiency, service quality, or transformation.

**Enterprise Architecture:** Refers to a strategic information base that defines the enterprise's mission; the information and technologies necessary to perform the mission; and the transitional processes for implementing new technologies in response to changing mission needs, including a baseline architecture, a target architecture, and a sequencing plan.

**Geographic Information Systems:** Information systems that involve locational data, such as maps or other geospatial information resources.

**Information Security:** Protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to ensure integrity, confidentiality, and availability.

**Interoperability:** The ability of different operating and software systems, applications, and services to communicate and exchange data in an accurate, effective, and consistent manner.

**Portal:** A Web site that serves as a gateway to a collection of information, services, and other resources related to a particular organization or activity.

# E–Government and Political Communication in the North American Context

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## INTRODUCTION

This article will introduce the concept of e-government, provide a model and background, and discuss emerging issues. Canadian examples will be drawn into the discussion as the country recognized as the leader in e-government (Accenture, 2004).

E-government (electronic government) is a component of e-governance (electronic governance). The context of e-governance includes such components as e-government, e-democracy, e-representation, e-consultation, and e-participation. E-government refers to those aspects of government in which information and communications technologies are or can be utilized and in which basic functions are to increase efficiency in administrative processes, to guarantee easy access to information for all, to provide quality e-services, and to enhance democracy with the help of new technological mediation tools (Anttiroiko, 2005). It can be seen to describe all of the processes (administrative and democratic) that combine to constitute public sector operations, as broadly defined by Grönlund (2002). E-government is defined as "the use of ICTs [information and communication technologies], and particularly the Internet, as a tool to achieve better government" (OECD, 2003). E-government involves goals of enhanced operational efficiency and enhanced effectiveness. Effectiveness gains are attributed to "a better quality of services and increased and better quality citizen participation in democratic processes" (Grönlund, 2002). E-government relates to how the government delivers information, services, and programs. It relates to who provides services and how the services are delivered (Lenihan, 2002). At the core of e-government is the provision of information. E-government tasks include who and how, while e-democracy deliberates on what is to be delivered. Determining what services are to be delivered is a function of policy deliberation. The ability to research policy issues is an important element of a democracy. Stakeholders can share in the responsibility for developing the policy agenda, policy outcomes, and policy effectiveness. Public participation in this process will be discussed under the topics of e-democracy, e-representation, e-consultation, and e-participation.

## E-GOVERNMENT MODEL

E-government and political communication can be modeled as a star topology. Members of the public eceive communications from the government and political representatives. The communication flow is unidirectional from the internal node to the external nodes. The single internal node is reminiscent of the root in the traditional government hierarchical form. The unidirectional information and communications flow is one-to-many or one-to-one. This unidirectional communication is a monologue vs. a dialogue. The agenda and content of the communication is determined by the central agency. Communication flow from the external nodes to the central agency occurs only in response to specific requests. The opportunities to participate in online services are determined by the central agency.

The primary attributes of e-government include information provision, service delivery, and program support. These components are altered in fundamental form due to their electronic structure. The government workflow is reconfigured due to electronic workflow and productivity implications.

Cremonini and Botterman (2002) define e-government as "the use of ICT to improve the efficiency, effectiveness, transparency, and accountability of government." They categorize participants of e-government, including citizens, businesses, other government agencies at the same hierarchical level, other levels of government, wider public sector (including nongovernmental agencies), foreign governments, and supranational entities. This expansive list of e-government participants may be involved in the information flow either to or from the government.

Information provision supports government transparency and accountability with implications for building a healthy democracy. The key distinction between e-government from e-democracy is this unidirectional flow with no dialogue and feedback provisions available at the point of contact. Accessible information is a basis for democracy and supports government legitimacy. Information sharing is a critical precursor to allow for e-democracy to develop. An understanding of the issues,

questions, and alternative solutions is necessary to support a deliberate and valid discourse available through e-democracy. As Lenihan (2002) points out, the Internet can provide more than a tool for disseminating documents. It can become a venue for discussion, debate, and engagement. E-democracy is based on this ICT extension of the democratic public sphere.

In Canada, this model serves to further a national vision. Canada's e-government goal is "to be known around the world as the government most connected to its citizens, with Canadians able to access all government information and services online at the time and place of their choosing" (Accenture, 2004, p. 68). The majority of Canadians have accessed e-government information, services, and programs. Of the 63.41% of Canada's population who are regular Internet users, 79% have visited an e-government Web site (Accenture, 2004).

In the United States, the E-Government Task Force clearly understands the merit of e-government. The Task Force stated:

*E-Government is critical to meeting today's citizens and business expectations for interaction with government. It will enable agencies to align efforts as needed to significantly improve service and reduce operating costs.* (Forman, 2002, p. 3)

E-government is based on a desire for time efficiency and cost effectiveness relating to the provision of information and access to services and programs. Connected members of society enjoy the ability to access government information quickly and easily. Government enjoys the efficiency of providing information, services, and program through online tools. Mass processing of transactions is time-efficient and cost-effective when compared to labor-intensive processes used in the past.

## TIME EFFICIENCY

In an average day:

- The majority of my work day is spent at a computer.
- I use the Internet to gain information necessary to complete professional and personal tasks.
- I may shop online.
- I am involved in online learning (e-learning).
- I communicate with friends and colleagues predominantly through e-mail.

The way I work, shop, learn, and communicate has radically changed due to the use of ICTs. The tools I use to complete my daily tasks are based on ICTs. My methodology has changed as well as my relationships with individuals and organizations with whom I communicate. Whom I contact, what tasks I complete, the amount of time resources, what information I obtain, and how I communicate with individuals involved have changed fundamentally due to the use of ICTs. My objectives are facilitated by online activities. Similarly, the objectives of organizations and governments are facilitated by my online activities. The symbiotic beneficial relationship (win-win) is an attribute of e-government.

E-government is based on citizens receiving information, services, and program support from government facilitated by ICTs. The government benefits from my use of the Internet in that this form of communication is very efficient from a human resource perspective. I also benefit from being able to find the answers to my questions through documented sources at anytime and from anyplace. For example, leading up to the recent federal election, there was news media coverage of the various party leaders relating to military spending. I was able to determine the exact amounts proposed in each party's budget and to read additional text on each party's platform. Telephoning party officials during work hours in order to request a mailed copy of each platform would have cost substantially more in human resources and time. Instead, the information was readily available to me with the click of a mouse, and I was able to make an informed electoral decision.

A growing number of Canadians are seeking government information similarly with the click of a mouse. In 1998, 8.2% of all households sought government information over the Internet. This figure increased to 29.2% in 2002 (Statistics Canada, 2004a). The number of Canadians visiting the federal government's Canada site has increased substantially. There were approximately 16 million visits to the Web site in 2003 (Government of Canada, 2004). The number of visitors increased 21% from 2002. Generally, client feedback has been positive, with 86% of visitors finding the information sought (Government of Canada, 2004). Citizens also are coming to expect online provision of information, services, and programs. The following statistics shared by Zussman (2002) clearly show the public's support for e-government initiatives:

- 77% of Canadians believe that the Internet will improve how they receive services from the government of Canada.
- 73% believe that putting services and information online is a good use of tax dollars.

## COST EFFECTIVENESS

Mass communications such as online provision of information is extremely efficient when compared to historical

labor-intensive processes. The E-Government Task Force asserts that a reduction in overlap and redundancy will reduce government costs and improve citizens' ease of access. The Task Force concluded the following:

*E-Government offers the opportunity to streamline activities, improving productivity by enabling agencies to focus on their core competencies and mission requirements. E-Government initiatives eliminate unnecessary redundancy, while improving service quality by simplifying processes and unifying agency islands of automation.* (Government of Canada, 2004, p. 7)

The cost-effectiveness of e-government has been established in various studies. Online transactions completed by individuals are inherently cost-effective in requiring less human resources be provided by government. A recent study conducted in Canada showed a significant cost savings. Costs per transaction averaged $44 for an in-person transaction, $38 for a mail transaction, $8 for a telephone (agent) transaction, and a mere $1 for an online transaction (Accenture, 2004). The figures vary per type of transaction, but generally provide cost-effectiveness through the use of e-government tools.

## POLITICAL COMMUNICATION

E-government extends beyond government processes to include political parties who also are increasingly seeking a Web presence. In Canada and the United States, Web sites are providing political party platform information, detailing candidate biographical information, selling party memberships, requesting political campaign contributions, recruiting volunteers, and often offering a means to communicate through an e-mail feedback form. In Canada, 58% of Canadian members of Parliament (MPs) have a Web site with 19% developing a Web site (Valeri & Lenihan, 2003). Of this group of MPs, only 27% use interactive tools such as an online feedback form or online surveys in order to allow citizens to express their views on issues (Valeri & Lenihan, 2003). A similar survey determined that 80.3% of MPs surveyed have a personal Web site, and 13.6% have undertaken online polling (Kernaghan, Riehle & Lo, 2003). Online dialogues relating to policy positions generally are not offered. The latter survey determined that 74.2% of MPs surveyed believed that the Internet was important or highly important in consulting with constituents (Kernaghan, Riehle, & Lo, 2003). Clift (2000) offered advice to wired elected officials (WEOs) seeking to enhance their online presence. Clift's (2000) top 10 tips include the following:

1. Use the Internet to communicate.
2. Use the Internet to disseminate information.
3. Develop multiple e-mail address identities on the Internet.
4. Promote e-democracy within your existing representative structures to enable wired public participation.
5. Use the Internet to connect with peers around the world.
6. Use the Internet to access information.
7. Use the Internet to access information smartly.
8. Use the Internet to be fed information automatically.
9. Use the Internet for intelligence.
10. Promote integrated services for all elected officials across the organization.

Kippen and Jenkins (2002) analyzed how political parties are responding to the challenges and opportunities of e-democracy. The authors discuss how e-democracy offers the potential to engage a greater number of voters and potentially to increase campaign funding and electoral success. This linkage has yet to be made and is considered of paramount importance. The authors astutely put the merit of the effort in context. They ask, "If political parties are too focused on the electoral process and ignore the citizen engagement efforts of e-government initiatives then how can they realistically hope to provide alternative views/approaches to the development of policy?" (Kippen & Jenkins, 2002, pp. 27-28). This issue is developed further in the article that discusses e-democracy and e-representation.

## BARRIERS

The vision of seamless government information and services provided through ICTs must address several barriers, including security of transactions, protection of privacy, digital divide, and globalization.

The Canadian government's Secure Channel is believed to respect individual privacy and to support secure online transactions through security and authentication services (Government of Canada, 2004). An e-government strategy must incorporate means to effectively control security of government systems. Security concerns are being addressed by the Canadian government through its e-pass authentication system, which is a public key certificate system allowing secure online transactions. Similarly, the United States government is developing an e-authentication project. System control capabilities are critical to both the operation of e-govern-

ment and to the involvement of the public. Citizens' perceptions and confidences in secure transactions are as important as the hardware and software security systems' capabilities.

An e-government strategy also must incorporate means to ensure privacy of personal information. Privacy concerns are raised when a proposed service leads to "an increased use of personal information, a shift from direct to indirect collection of personal information, use of personal information for purposes other than those for which it was collected, greater sharing of personal information, contracting out, or the creation of a common personal identifier" (Government of Canada, 2004, p. 24).

The United Nations (UN) recognizes two barriers to e-government: the digital divide and globalization. The primary challenge of e-government is considered the questionable inclusiveness of ICT access (UNDESA, 2003). The digital divide is a substantial issue with developing countries seriously lagging behind developed countries. Computer-literate individuals with access to ICTs may be a majority in many developed countries; however, this elite group is a minority when the global population is considered. The UN notes that approximately one-half of the world's population has never made a telephone call, and only 9.5% of the world's population has online access (UNDESA, 2003). Access to ICTs and functional computer literacy are essential yet largely missing in the developing world. A second barrier is the potential threat to governance institutions associated with a globally knowledge-empowered population. E-government is seen to shift the power balance between citizens and the state. The traditional government domain is impinged by global e-networks proliferating through ICTs (UNDESA, 2003).

The digital divide contributes to the democratic divide. Future research is needed to determine the impact of the digital divide on the political rights of individuals without ICT access. Access to political resources has implications for the efficacy of civic engagement. ICTs promise to mobilize civic engagement and to provide a public sphere for mass participation. This social benefit can be looked upon alternatively as a barrier. Depending on which side of the digital divide one is located, the balance of power may shift, thereby further reinforcing global and social divisions (Norris, 2001). As Norris (2001) warns, "Political resources available via the Internet will empower those with the resources and motivation to take advantage of them, stranding the disengaged farther behind" (p. 217).

Government On-line Advisory Panel (2003) calls for active involvement in order to enjoy the benefits of e-government. Civic engagement by four stakeholder groups—federal government officials, citizens, businesses, and the media—will contribute to e-government success. The panel believes that a communications and marketing strategy led by a service transformation champion is essential in order to engage these stakeholders.

## FUTURE TRENDS

The future of e-government is positive in light of the benefits for governments and citizens. Capitalizing on the benefits of online tools is challenging, given the rapid rate of technological change. Innovative approaches to issues may result in the implementation of yet unknown technological solutions. In the current state of change, we are unaware of potential solutions, as we may not even be cognizant of the problems. The future holds vast unknowns, and the approach taken by the networked society is a fascinating area for future research.

E-government is expanding to offer more services, programs, and communications online. E-democracy, e-representation, e-consultation, and e-participation are examples of e-government enhancements. The unidirectional communications flow of e-government is being displaced by bidirectional and multidirectional communications. The latest killer application is a focus on research activities. However, I believe that the critical issue will be at the other end of the ICT spectrum. The digital divide has implications for political relations based on access to ICTs. The democratic divide, a component of the digital divide, is the difference between those who do and those who do not use various digital resources to engage, mobilize, and participate in public life (Norris, 2001).

In Canada, there is a growing proportion of the population that has access to the Internet. In 2003, approximately 64% of Canada's population had at least one member of a household who used the Internet regularly (Statistics Canada, 2004b). The proportion of those who have ICT access has grown from the 2002 figure of 62% (Statistics Canada, 2003). However, the have-not group still constitutes one-third of Canada's population. The gap between the have and have-not groups has implications for each individual and also the social groups of which they are members. Access disparity has been shown to correlate to a person's level of income (Sciadas, n.d.). Other social characteristics of interest include the variables of age, education, ethnicity, geographic location, and gender. E-government provides information, services, and programs. There is political power having access. If individuals and particular social groups are marginalized, then the gap in the digital divide and political power allocations will widen. The have-not group is excluded from the benefits of e-government, which thereby widens social cleavages. As e-government advances, a proportion of the population is further marginalized and excluded from the increasingly critical provision of infor-

mation. The consequences of the digital divide are an important area for future research and social action.

The issue of online privacy also must be addressed. Does the public's expectation of online privacy mesh with ICT reality? The public has privacy rights relating to information held by government officials. The online environment challenges the government to maintain this level of personal privacy. With e-government, data is shared in some cases in order to improve horizontal management among departments. Sharing of information historically has been between an individual and a single government agency. In the era of e-government, this vertical and segregated management process is transposed into a horizontal and information-sharing process. Horizontal management of information coordinates services and data stores. This is a new management paradigm for a historically hierarchical bureaucratic structure. The sharing of information results in a diffusion of data responsibility and accountability. Accountability mechanisms are predominantly vertical, not horizontal, and changing these mechanisms will create cultural and organizational barriers (Richard, 2000). Successful implementation of the horizontal government structure and information flow is a challenge for government. As Stephen Rohleder stated:

*Governments need to integrate services seamlessly across horizontal and vertical levels of government. The technology challenges and the complexities of governance mean the task will not be easy, but only then will they be able to provide the truly seamless service that will drive broad take-up of services.* (Accenture, 2004, p. 2)

The Canadian federal government and, similarly, the United States federal government both are striving to implement an effective one-window main government portal in their respective countries. The integrated one stop model draws on the business effectiveness of offering consumer goods and services in a central location. A one-stop government portal is built on this premise of service consolidation and seamless communication flows. This ease of information flow promotes efficiency but at the cost of personal privacy, when confidential information is shared. Individuals unknowingly and unwittingly may have personal information residing in shared data banks. The protection of personal privacy is challenged in the e-government context and is an important area for future research.

## CONCLUSION

This article has discussed the attributes, benefits, barriers, and emerging issues relating to e-government. E-governance has the capacity to reengineer democratic government through e-government, e-democracy, e-representation, e-consultation, and e-participation. The Government On-line Advisory Panel asserted in their first report of 2002 and again in their final report dated December 2003 on the transformative capacity and magnitude of e-governance:

*We have been struck by the sweeping potential of this initiative both for the direct changes it is starting to bring and as a catalyst for far broader indirect change. Because this initiative, in its essence, involves changing the ways Canadians communicate with each other and government, it has the potential to change—and in largely unpredictable ways—the most basic relationships that underpin our society. ... All of this implies that government must be not simply restructured but reconceived to accommodate, but just as important to anticipate, the waves of change that will erode traditional relationships even as new ones are created.* (Government On-line Advisory Panel, 2003, p. 9)

The application of ICTs has implications for economic, social, and political contexts. Riley (2004) recognizes the transformative power of ICTs as "the sheer amount of information available, the ability to communicate information, and the value that individuals put on information, is bringing a new understanding of the nature of information itself." This change process is not without precedent. For instance, the Gutenberg printing press resulted in massive changes throughout society. Our ability to communicate was changed radically with its invention. Such change ripples through society and governments to reform communication processes. Computer networks offer a similar revolutionary change to communication patterns.

The *e* in e-governance, e-government, e-democracy, e-representation, e-consultation, and e-participation refers to *electronic* but could also refer to *enabling*. The Internet is a modern-era Gutenberg printing press with its capacity to change societal channels of communication and governance systems. "The tools of technology allow for an active exchange of information, which in turn allows for a significant shift in the government-citizen relationship" (Riley, 2001). The instrumentalist approach to ICTs is shared by the Commonwealth Centre for Electronic Governance, which stated:

*[E]-governnance is a tool. And like any other tool, no matter how powerful, it has limited value and relevance in itself. Its value arises from its application to specific goals and objectives. E-governance is really about choice. It is about providing citizens with the ability to choose the manner in which they wish to interact with their governments.* (Finger & Pecoud, 2003, pp. 7-8)

E-government is an emerging dimension of good governance. Future changes to governance attributable to the application of ICTs are unknown. The potential benefits and magnitude of the barriers associated with e-government and the wider context of e-governance are yet to be comprehended fully. E-government and its impacts on political communications and the democratic process are only beginning to be understood. The future will see further efforts being undertaken, evaluations being shared, and future projects being improved. The saying "the only constant is change" is particularly applicable as we continually strive to harness technological capabilities. With the speed of technological change, e-government promises to bring innovative enhancements to the relationship between citizens and their government.

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## KEY TERMS

**Civic Engagement:** Encompasses three distinct dimensions: "political knowledge (what people learn about public affairs), political trust (the public's orientation of support for the political system and its actors), and political participation (conventional and conventional activities designed to influence government and the decision-making process)" (Norris, 2001, p. 4).

**Digital Divide:** Encompasses three distinct dimensions: "The global divide refers to the divergence of Internet access between industrialized and developing societies. The social divide concerns the gap between information rich and poor in each nation. And finally within the online community, the democratic divide signifies the difference between those who do, and do not, use the panoply of digital resources to engage, mobilize, and participate in public life" (Norris, 2001).

**E-Democracy (Electronic Democracy):** "The convergence of traditional democratic processes and Internet technology. It refers to how the Internet can be used to enhance our democratic processes and provide increased opportunities for individuals and communities to interact with government" (Clift, 2004, p. 11).

**E-Governance (Electronic Governance):** "The commitment to utilize appropriate technologies to enhance governmental relationships, both internal and external, in order to advance democratic expression, human dignity and autonomy, support economic development and encourage the fair and efficient delivery of services" (Riley, 2001).

**E-Governance (Electronic Governance):** "Seeks to realize processes and structures for harnessing the potentialities of information and communication technologies (ICTs) at various levels of government and the public sector and beyond, for the purpose of enhancing good governance. As a concept e-governance can be perceived to be contextually inclusive of electronic democracy (e-democracy), electronic government (e-government) and electronic business (e-business). As an initiative at a national, governmental, or community level, e-governance can be perceived within the context of a country's national information infrastructure which, in turn, can be perceived to be part of the emerging global information infrastructure ..." (Cremonini & Botterman, 2002).

**E-Government (Electronic Government):** "The use of ICTs, and particularly the Internet, as a tool to achieve better government" (OECD, 2003). It refers to those aspects of government in which information and communications technologies are utilized or can be utilized, the basic functions being to increase efficiency in administrative processes, to guarantee easy access to information for all, to provide quality e-services, and to enhance democracy with the help of new technological mediation tools (Anttiroiko, 2005).

**Information and Communication Technologies (ICT):** "Technologies for storage, processing, representing and transmitting information between humans, between humans and machines and between machines" (Cremonini & Botterman, 2002).

**Information Society:** "Involves rapid, broad and deep access to and exchange of information among all elements of society" (Cremonini & Botterman, 2002).

# E-Government and the Risk Society



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## INTRODUCTION

The modern "risk society" does not necessarily focus on an increase in overall risk to citizens. It is more focused on trying to predict and reduce risk in the context of the speed and complexity of globalisation. Anthony Giddens observes that society is organising itself increasingly around the mitigation of risk, and Ulrich Beck notes that the assessment and mitigation of risk is undertaken in a systematic way (as cited in "Risk Society," 2005). While society has always been confronted by external risks (floods, earthquakes, etc.), the risks within e-government are primarily manufactured risks, produced by largely uncertain outcomes of the integration of information and by the ways in which information technologies are used within government. For example, CCTV (closed-circuit television) can be used in a planned manner to monitor and deter crime in public spaces, but an uncertain outcome can be the risk of all citizens being proactively monitored by government.

## BACKGROUND

Manufactured risks within e-government arise through two primary processes that are themselves aiming to deliver benefits to citizens. First, information about citizens is integrated and shared across functions of government so that services can be delivered more effectively to citizens. Included in this activity are the transformation of government, citizen-centric services, and the rebuilding of relationships between government and citizens, for example, the European Commission's (2005b) aspiration to "reconnect Europe with its citizens." Second, using information networks such as the Internet and digital television, government services are made widely accessible to citizens in locations that are suitable for them. The integration and sharing of information, within increasingly complex information systems, is intended both to increase the efficiency of government and to deliver services faster ("killing time"). The network availability of services is designed to make services available anywhere ("killing geography"). The emergent manufactured risks arise through what is termed the "dimensions of unintended consequences" (Lash, 2002, p. 50). For example, Windows XP, containing over 40 million lines of code, produces unexpected risks through security failures that were not predicted, and the users of XP to some extent are both users and testers of the operating system.

Manufactured risks in e-government are not scientific in the same sense that living next to a river entails a definable risk of flooding. Furthermore, the prioritisation of manufactured risks often is not a scientific process, but is a social, cultural, and political process. Thus, the political prioritisation of the risk of terrorism[1] in the USA influences many of the processes of governance, with significant investment into the integration of information for surveillance purposes (Roberts, 2004). Consequently there is a "cultural and institutional matrix" that determines how risks are constructed and prioritised (Bulkeley, 2001, p. 442). For example, regarding food safety, the prevailing approach to risk until recently was to regularly inspect food premises. That has changed in some nations to a risk-based approach (Food Safety and Inspection Service [FSIS], 2001) that uses information, analysis, and forecasting operations to identify where risks are highest and where staff resources should be invested in inspection: a move away from the routine and reactive to information-driven risk assessment.

## TECHNOLOGY AND INFORMATION INTEGRATION

While risk is linked to uncertainty, the e-government agenda assumes that more information and better services to citizens will serve linearly to help offset the impacts of the risk society. E-government is focused on the network society. It is a process that on one hand is promoted by governments as being a way in which to improve services to citizens and to engage citizens more effectively with governance. On the other hand, however, e-government is usually performed as certainty, a technological process that can downsize and reinvent government, saving money, improving cost effectiveness, and delivering government primarily through electronic channels. E-government is thus grounded in political planning, assuming that government can automate services and join them up seamlessly to provide citizen-centric services that are individually targeted and consumed via

information technologies, and assuming that information technologies will deliver predictable benefits and few disadvantages (Hudson, 2002).

Both the risk society and e-government involve the utilisation of technologies within organisations and institutions (termed enactment; Fountain, 2001). Underpinning the delivery of e-government is the process of the removal of human intermediaries between citizen and service: This is termed disintermediation. Underpinning the risk society is the process in which citizens are presented with an often bewildering range of advice and information about the identification of a risk and its evaluation, and the potential or proposed responses to risk situations: This is termed re-mediation. Consequently, central to both the risk society and e-government is the production, dissemination, and consumption of information. The production of information for e-government services requires greater attention to information linkage and integration, with associated risks that information quality and consistency may be variable, and privacy and confidentiality may be compromised, along with the risk that governments will engage in "function creep." Consequently, "government therefore needs to engage with the public and opinion-formers to explore and communicate the benefits and risks" (CST, 2005).

## CONTESTED INFORMATION

The risks, however, are not concentrated on the consumers of government services: the citizens and businesses. Legislation such as freedom of information (FoI) or policies to liberate access to public-sector information (PSI) can lead to government information being used, combined into market services, and critically evaluated by an increasing range of information users who may have locally produced data that are better in quality than government data. This process was seen with the UK 2001 Census of Population, when the cities of Westminster and Manchester successfully contested the official census figures. The basis of the challenge was a claim that the official national census had undercounted residents in the cities. Since much government funding is linked to the official population, there were adverse financial consequences. The enquiry into the census found that it was indeed in error (Statistics Commission, 2003). There is, therefore, a paradox of e-government in that the increased availability of information leads to an increased risk that government policies and information will be contested. There is a further lose-lose paradox for government as well in that no local government area will contest the official figures because the census overcounts its population, and the government cannot contest its own figures because they are official.

## COMMUNICATION AND TRUST

Risk increases as the historical routine life patterns (synchrony) are disrupted by the increasing speed across space (asynchrony) of modern society. It is not just that more information is being consumed by citizens, but also that the risk events are both exacerbated by citizens' consumption patterns and increasingly difficult to evaluate—the calculation of risk is ever more complex, and the dilemmas about whose risk calculation to trust (the cult of the expert is diluted with access to Internet-based information) also increase. By contrast, e-government is oriented strongly toward the synchronisation of information in predictably constructed services.

Hassan (2005) cited the example of the human form of mad cow disease (bovine spongiform encephalopathy, or BSE) that caused major scares, though low human death rates, in the United Kingdom in the 1990s. The UK government enquiry into BSE highlighted the potential contradiction emerging in the traditional precautionary principle toward health risk (Calman & Smith, 2001) and the relatively low probability of being infected with a rare but deadly illness:

> *The public was repeatedly reassured that it was safe to eat beef. Some statements failed to explain that the views expressed were subject to proper observance of the precautionary measures which had been introduced to protect human health against the possibility that BSE might be transmissible.* (Phillips, 2000)

Furthermore, the enquiry report criticised government agencies for not releasing information to the public since there was a tension between telling citizens that there was a risk that beef may be infected with BSE and the possible catastrophic decline in beef consumption leading to "the possible effect on exports and the political implications" should news become known internationally that UK cattle were infected with the disease (Phillips, 2000).

What BSE demonstrates is that the geographical, temporal, and structural complexity of globalised food chains, and of business supply chains, introduces manufactured risks that challenge the abilities of governments to process information. However, the more information is released into the public domain, the more likely it is that citizens will evaluate risks in an emotional and not a statistical way. With increased confusion and increased fear of risk there is a paradoxical decline in the communication of risk by government: Indeed, the fear of communicating a false risk can be politically more damaging than the noncommunication of a real risk. The outcome often is a reliance on "technoscience," the cult of the media expert, the consumption of multiple sources of new authority on the Internet (Burrows, Nettleton, Pleace, Loader,

& Muncer, 2000), in which "the authority and legitimacy of the state, science and technology are no longer taken for granted" (Schedler & Glastra, 2001, p. 347). This observation conforms also to what Lash (2002, p. 142) terms the "disinformed information society," in which citizens are faced with overwhelming volumes of information, and in which governments increasingly assume that citizens understand informational complexities and can evaluate information using technologies. There is thus the risk of a "spiral of mistrust," in which the government collects more information about citizens, citizens trust the government less, and the government responds by more information collection, resulting in "less privacy in this risk society" (Regan, 2002, p. 402).

## UNINTENDED CONSEQUENCES

Unintended consequences, and new manufactured risks, emerge also through the increasing availability of government information, whether it is through FoI or through commercialised services. Indeed, the ways in which risk is being shared in society is changing, particularly in the context of home ownership. Insurance risk historically has been shared across a broad geographical area such as a town. With access to detailed official statistics, it is becoming possible to assess insurance risk for individual properties. The intended consequence is that people do not have to pay more than they should for risks attached to their property. The manufactured risk, however, has been that certain properties can be rendered as noninsurable, as well as the enabling of the "non-insurability of an ever-increasing number of catastrophes" (Bougen, 2003, p. 254). The spiral of mistrust is therefore fed by the increased availability of government information (Environment Agency, 2003) that is used in commercial products and services to predict the risk of events such as flooding (Norwich Union PLC, 2004), which then suffer the "dimensions of unintended consequences" where property no longer is insurable and property prices suffer (ITV, 2004).

The spiral of mistrust further highlights the contradictions of e-government. On one hand, e-government is seen by governments as a mechanism through which citizens will overcome the crisis of trust in government and its institutions, and that will consequently build higher levels of trust with government (O'Neill, 2002). Goals here include encouraging citizens to participate more in governance, and making individuals and agencies of government more accountable to citizens. However, a countervailing message from capitalist governance is a more aggressive focus on the individual. E-government services are provided to be consumed in a climate of individualism, where the citizen increasingly has to take on key life-path risks that historically were the domain of government, for example, job instability, skills training and knowledge acquisition, and pensions and health well-being for old age. Consequently, "individualisation seems to be the corrosion and slow disintegration of citizenship" (Bauman, 2000, p. 36).

## SURVEILLANCE

A further informational paradox is therefore introduced: More information about the actors is required by all the other actors so that they can each evaluate the actions of the others. An emerging risk is that information availability and e-government will lead not to a participative society, but to an extension of what Michel Foucault termed a "disciplinary society" (Cutting, 2003). The literature on the information society frequently cites an information culture where an all-seeing government joins up information within e-government services and then uses that information to monitor citizens (the "panopticon"), and where the panopticon extends beyond government services into the public spaces of everyday life through CCTV systems, for example. Individualisation then has its counterpoint of disciplinary surveillance through political interventions in Europe, from the use of those that reduce the risk of children accessing unacceptable Web content (BBC, 2004), reduce the risk of cybercrime (European Commission, 2004b), and work to determine the risk of terrorist attack (European Commission, 2004a), to the use of satellites to monitor the actions of European farmers (Elliott, 2005).

The intended predictability of e-government consequently sits uneasily within the uncertainties of modern society, uncertainties that Bauman (2000) terms "liquid modernity." Bauman notes that the threats of surveillance through the informational panopticon lead to uncertain responses where "the many are watching the few" in what he terms a "synopticon" (p. 85). The synopticon sees the use of information by citizens through blogs, activist Web sites, and intermediary information services that provide easy access to the performance of politicians.[2] Yet another manufactured risk arises from the well-intentioned policy of e-government to make information accessible and useful. A citizen reaction to that is to demand ever-increasing ethical standards from politicians and from those public and private agencies and people involved in the provision of e-government services (Mullen & Horner, 2004).

Following on from this, the public and media scrutiny of government is becoming extreme, particularly as the diversity of actors, agencies, and intermediaries increase,

and "representatives will need to adapt their working practices so that they are not overwhelmed by new channels of connection with the public" (Hansard Society, 2002, p. 25). The commensurate decline in trust is leading to negative impacts on e-government developments such as e-voting, for "there is no such thing as a completely secure electronic system, and therefore e-voting will never be error free" (Moynihan, 2004, p. 526). The panopticon and the synopticon work in competition against each other, with e-government needing the construction of a more extensive information environment in an attempt to overcome the risk that contemporary society is "humanly unmanageable" (Robins & Webster, 1999, p. 106).

## INCREASING DIVERSITY OF SERVICES AND SERVICE PROVISION

There are, it must be stressed, positive examples of the interactive provision of information and risk. The geodemographics industry uses confidential information about individual citizens to construct risk assessment related to financial probity. The balance of risk to privacy, vs. the derived public good (Cate, Litan, Staten, & Wallison, 2003), enables individuals to travel the world and to undertake action at a distance in real time by purchasing goods with electronic banking cards, but this very ease of mobility produces manufactured risks in the context of illegal immigration, leading to the e-government promotion of electronic identity management for civilian services and for border control (European Commission, 2005a).

The communication of risk is often different between the private sector and government. The private sector often uses public-sector information to build products that inform citizens and businesses of information and metadata relating to environmental risks, while at the same time leaving it to the customers to decide the extent of the risk (Landmark Information PLC, 2003). Government, as we have seen with BSE, is usually expected to inform citizens of risks. In Hong Kong the Slope Information System provides online warnings to citizens of the risks of landslides in their vicinity (Hong Kong Government, 2003). This form of risk assessment is provided when the analytical capabilities of the citizens are insufficient for them to work out their own risk assessment. Deeply embedded into this system are trust and credibility, and the "eventual integration of the risk into the communal fabric requires prompt and accurate government information, multiple channels of information provision and framing, and opportunities for public reaction and communal sense-making" (Maxwell, 2003, p. 253) because government may not need to communicate risk when the risk of adverse reaction, such as mass panic, is higher.

## CONCLUSION AND FUTURE TRENDS: INCREASING SPEED AND UNCERTAINTY

Thus, the openness and informational freedoms of e-government are often threatened by the risk of the total openness of information. The risk of communicating, as noted above, is deepened in the post 9-11 environment by the risk of letting information remain accessible. The risk of global terrorism using publicly accessible information is regarded by some governments as being greater than the risks of information censorship or the removal of information through a process of data scrubbing (Federal Geographic Data Committee [FGDC], 2004). Risk, uncertainty, and the desire for e-government certainty continue to interact in uncertain and unpredictable ways, and the production of manufactured risks increases as e-government integrates and shares information through networked technologies. Citizens look to government for increased quality of services, freedom of information, and better information and advice. Yet, they will demand more protection from the risks of globalisation and cybercrime, while at the same time being required by government to absorb more of the risks themselves.

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## KEY TERMS

**Citizen:** A member of a country or state.

**Disintermediation:** The removal of intermediaries from a government process.

**Information Integration:** Linking information within and across the agencies of government.

**Information Sharing:** The exchange and use of information beyond its original purposes.

**Risk:** Potential adverse effects that may occur from a process of e-government.

**Surveillance:** The visual and information monitoring of the behaviour of citizens.

**Technology:** Technical devices that are used within a governance and societal context.

**Trust:** Being confident in the processes and actions of government.

## ENDNOTES

1 http://www.whitehouse.gov/infocus/homeland/

2 for example, http://www.theyworkforyou.com/ in the United Kingdom

# E-Government as a New Frontier for Legal Theory



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## INTRODUCTION

E-government has the potential to change fundamentally the organization of governments, and the governance practices used in relations with citizens and other governments. Legal theory is clearly affected by these changes. Yet there is no rush to publish on e-government in leading legal theory journals, and there is no visible surge in student demand for courses in e-government. Just as only some areas of governments in developed states have taken advantage of new information communication technologies, so only some areas of legal theory have engaged e-government. Issues in Internet governance and personal privacy dominate legal theory's engagement with e-government, while e-engagement of citizens plays an increasingly important yet still limited role in governments' interaction with citizens. Yet there are signs that this gentle pace may soon change, as leading jurisdictions approach completion of the first wave of service transformation at the same time as concerns regarding a digital divide recede under the growth of access to new information communication technologies. New opportunities for e-government may soon make e-government's progress revolutionary rather than evolutionary, and legal theory will be forced to keep pace.

## BACKGROUND

The central questions and methods of legal theory are relatively easy to identify, while the boundaries of legal theory are not, for reasons worth exploring in the context of e-government. The most general question is "What is law?" naturally asked along with "What is a legal system?" and "What is *a* law?" These central questions are often thought to be connected by their shared concern with law's "normativity" or special capacity to assert authority to issue nonoptional norms, which norm subjects typically obey under the guidance of legal officials. The dominant approaches to these questions can be roughly distinguished as descriptive or normative. Descriptive approaches (such as legal positivism and legal realism) use normatively or morally neutral methods in their attempt to describe and explain legal phenomena. Descriptive approaches typically claim the virtue of clarity in understanding legality and legal phenomena as they appear in diverse ways in diverse social situations. By contrast, normative explanations of legal phenomena (such as natural law or Marxist theories) simultaneously evaluate phenomena from the standpoint of normatively committed moral or political theory (Patterson, 1996). Normative approaches typically claim that such neutral analysis is impossible, and argue that the kinds of concepts employed in understanding law are necessarily applied in a normatively committed fashion which reflects our ultimately moral motivations for understanding law—to know how to improve it, to know when to criticize it, and to know how and when to provide justification for it.

Both descriptive and normative approaches may be found separately and in blended theories providing answers to legal theory's core questions, and in adjacent questions typically focused on particular jurisdictions' or eras' experience of law's capacity to require, make permissible, enable, and deny. This experience appears in various areas of legal theory, including discussion of the nature and justification of civil liberties, punishment, privacy, property, contract, and others. Investigations outside the core certainly affect the way core questions are answered, yet there is considerable debate regarding the conditions under which answers to the core questions ought to be changed in light of peripheral developments. These debates are particularly acute at the intersection of legal theory's core questions with theoretical dimensions of social scientific dimensions of disciplines whose focus includes legal phenomena: sociology of law, legal anthropology, and some dimensions of legal history. It is not unreasonable to ask at these junctures just where legal theory comes to an end, and a disciplinary investigation, for example, sociology of e-participation, has begun. Once core questions are left legal theory is not easily distinguished from surrounding disciplines, and mere focus on legal phenomena by a discipline naturally facing theoretical questions does not amount to "legal theory" in any informative sense of the term. It is advisable then, for reasons of clarity and to avoid unnecessary engagement in methodological debate, to confine this discussion

to the effect of e-government on legal theory's core questions, and within those borders to strive for clarity in understanding what, precisely, about the social phenomena of legality or lawfulness is affected, if at all, by e-government.

The early days of e-government brought little of obvious interest to legal theory's core questions. Many changes appeared to affect the business operations of government, and not the nature of government itself, providing increased efficiencies in existing processes under a thin veneer of innovation. Where processes and services were converted from a paper base to an ICT base, processes and services often remained largely the same (OECD, 2003). The institutional and sometimes constitutional inertia of existing "silos" of authority in government augur against units of government using the new ICTs to seek new methods of collaborative interunit policy making, to change services, or to change the way a service is delivered. Doctrines of ministerial responsibility, for example, have tended to establish decision-making hierarchies within the public service which cannot be easily changed simply because there is some merit to doing so and available technology to do so effectively. Similarly, provision of online "brochure ware" touting a department's function seems to be a novel mode of advertising and little more, as do haphazard attempts at ICT-enhanced public consultation. Indeed, to the extent that e-government technologies do not change the nature of government or citizens' interaction with government, e-government has no effect on the core questions of legal theory and a limited effect on adjacent questions. Two developments and their infrastructure have, however, generated issues of interest to legal theory's core and adjacent investigations. Let us begin with infrastructure.

## E-GOVERNMENT AND LEGAL THEORY TODAY

### Internet Governance

*Governance of the Internet* has implications for our understanding of the nature of legal system, sovereignty, and the legality of what is said to be international law. Any attempts to use distinctively legal norms to govern the Internet must recognize that while states may conceive themselves to have vital interests in certain uses of the Internet, the Internet is not the kind of thing which is at risk of being hoarded or occupied by a state in the absence of agreement to make it an internationally held and governed entity. The Internet is a nonterritorial communications method using largely nonproprietary standards to enable territorially located users to exchange information. The Internet is not itself dependent on any particular physical location or piece of enabling software. Precisely how the Internet's nonterritoriality and nonproprietary standards might matter to legal theory is presently emerging. The United Nations (UN)-sponsored World Summit on the Information Society (http://www.itu.int/wsis/) has given political clout to efforts to internationalize governance of technical standards, naming and other resource allocation, and Internet use policy and dispute resolution. The UN-sponsored Working Group on Internet Governance and the International Telecommunications Union are leading these efforts, which may soon displace prior acceptance of the U.S.-based ICANN (Internet Corporation for Assigned Names and Numbers) and the (IETF) Internet Engineering Task Force (IETF), and still earlier reliance on self-regulation carried out by volunteers. As the Internet grows in social and economic importance, the list of those seeking to influence the Internet's governance has grown, now including states, coalitions of states such as ASEAN and the G8, and international organizations of varying degrees of formality, including the World Intellectual Property Organization (WIPO), the World Trade Organization (WTO), and the Organisation for Economic Co-operation and Development (OECD) (Mueller, Mathiason, & McKnight, 2004).

Displacement of nationally based Internet governance by international bodies does not, however, automatically amount to international Internet governance via legal institutions of norms. Many legal theorists are skeptical regarding the legality of what is purported to be international law, pointing to its lack of an authoritative norm-setting body, lack of adjudicative bodies holding compulsory jurisdiction, and lack of enforcement power. If the legality of international law is itself in doubt, the legality of international norms which eventually emerge from the UN-gathered coalition of state and nonstate actors may be equally in doubt. The problem of assessing the legality of international Internet governance may be made even more complex by the nonterritorial and nonproprietary nature of the Internet. While the struggle goes on to internationalize governance of technical standards and naming, convergence of the Internet with technologies such as mobile telephony continues, and hacking and viruses and other free-flowing "pollutants" of the Internet threaten sovereign states' interests. Sovereign states may soon find themselves less interested in naming conventions, and more interested in issues whose importance to sovereign states gains them the attention of legal theorists, particularly issues concerning the security of national borders and national wealth. A wide range of descriptive and normative questions arise in this tension between state interests and an international resource. On what principled descriptive or normative basis could a distinction be made between a state's communications

capacity and legal jurisdiction over that capacity, and international Internet "space" beyond the proper regulatory authority of individual states? What institutions can generate legal norms capable of guiding governance of the Internet's nonterritorially located, nonproprietary standards for information exchange—and what normative considerations ought to guide choice of those institutions? Is a new category of genuinely international law—not merely bi- or multilateral agreement—created by the chosen institution and norms governing a nonterritorial, nonproprietary resource incapable of being owned by any one state?

## E-Service Delivery to Citizens

*Portal-based service transformation* is also bringing new issues to areas of legal theory, particularly those concerned with privacy, identity, and citizenship under law. A portal is a virtual, typically Web-based gathering point for services or information grouped according to some purpose, usually users' needs. In this context, "joined up" or "seamless" services are services from disparate government units brought together in a single access point for end users (OECD, 2003). Leading jurisdictions such as Singapore have achieved a great deal, using service categories such as the idea of a "life event," for example, seeking housing, to group services according to citizens' needs (www.ecitizen.gov.sg). Yet compelling evidence suggests that no government has achieved fully joined-up services, for reasons including ICT-platform interoperability, silos barring collaboration, and concerns regarding privacy and transactional security as sharing of personal information among government units may involve objectionable uses of personal information (UNDPEPA, 2003).

Privacy, security, and trust have emerged as critical practical issues for e-government advocates seeking to deliver services to citizens while complying with existing and emerging legislation and public expectations. The practical nature of these issues may strike many legal theorists as being outside the core questions of legal theory, and into the shared boundary with political theory and ethics, and perhaps technical issues in applied computing. At that border a familiar range of straightforward legal questions may emerge regarding the substantive adequacy of legal norms intended to protect citizens' physical and informational privacy, often conceived as a dimension of their personal security.

Yet there is more to privacy, security, and trust than these practical issues, and a range of questions relevant to legal theory's account of citizens have yet to be thoroughly investigated. Those questions concern the implications of the full meaning of "Internet": inter*networked* ICTs. Privacy, as a dimension of personal security, is typically taken to refer to our interest in controlling what others know about us in order to secure freedom of thought and conduct against others' interference with exercise of those freedoms. The exercise of privacy involves withholding of personal information to some desired extent, often involving highly context-dependent choices regarding the personal interests satisfied by relinquishing privacy. (To a lesser extent privacy connotes and is sometimes legally recognized as an interest in a more substantial sense of freedom, that of being left alone; but this sense may be set aside here in the context of an increasingly and nearly unavoidably urban and connected world.) The kind of public "trace" or persona created by selective disclosure of personal information has long been important in various ways. Consider, for example, many persons' interest not just in the fact of having a credit record, but in having an accurate credit record maintained and made consistently available across a network of users to enable him or her to secure credit as desired (Friedman, 2000). Contemporary worries regarding the technical adequacy of privacy safeguards may soon be turned on their heads by citizens' interest in taking fullest advantage of the efficiencies and service improvements available from joined-up services and information sharing across government departments. Citizens may yet become more interested in how and whether their digital persona can be preserved and developed, and not how privacy interests can be used to justify a lack of engagement with government. A range of descriptive and normative questions regarding the nature of citizenship and law's subjects may rapidly emerge. Might rights to security of the person be reasonably extended to digital persona? Could digital persona be meaningfully held liable for the consequences of choices—perhaps even automated choices resulting in automated law enforcement, for example, tracking fraudulent use of social services? And might multiple digital persona be held by the same originating legal agent, mirroring his or her dual citizenships, or special positional duties in specific contexts? Some of these concerns might become especially pressing as e-citizens take their digital personas from service delivery to public consultations and other exercises in democratic participation in law making or policy making.

## E-Government and Democracy

*E-engagement* of citizens raises concerns for both descriptive and normative approaches to legal theory, as technology may be implicated in reducing or raising fresh barriers to citizens' meaningful access to information, and participation in governance. Australia, Canada, the United States, and the United Kingdom have all engaged

in extensive e-consultation exercises, typically gathering public opinion regarding policy options (excellent links may be found at http://www.egov.vic.gov.au/Research/ElectronicDemocracy/edemocracy.htm). Consultations are typically Web-based exercises in provision of information, online deliberation (using tools such as discussion fora), and opinion gathering via questionnaires and similar mechanisms. E-voting is also being piloted in several jurisdictions, motivated by hopes of cost, reliability, and security improvements over paper-based ballots. These methods of e-participation may be particularly worth investigation in the context of some states' pursuit of internal devolution. In the United Kingdom, for example, Scotland and Wales have regained limited legislative authority and aim to exercise that authority in novel ways intended to redress a perceived lack of trust and engagement between government and governed. The Scottish Parliament, for example, is pioneering a Web-based e-petitions system, allowing anyone to petition the Scottish Parliament on a matter within its jurisdiction (www.e-petitioner.org.uk). Yet this experiment, like many others, has had limited success, for reasons including low participation rates and reluctance on the part of elected officials to share or surrender authority to the results of novel processes in which few citizens have participated.

In the absence of substantial effects on governance practices or the structure of government, legal theorists have had few reasons to suppose e-participation amounts to anything more than local attempts at reform to better enable specific political systems to strive for democratic ideals. To be sure, there are ontological issues regarding the possibility of "virtual community," speculation regarding the possible fragmentation of political discourse (Sunstein, 2001), and concerns regarding the digital divide and access to a virtual global civil society. Yet these debates are largely at the periphery of legal theory, at its juncture with sociology, political theory, and other investigations. Some beginning attempts have, however, explored the potential effect of e-petitioning and e-consultation on the relation between law's officials and private citizens and their role in constituting a discrete legal system. Increased citizen participation in consultative processes may blur the lines between officials' and citizens' roles in the formation and interpretation of laws, causing difficulties for state-based theories of law which look to the practices of officials to delineate the borders of a legal system and state containing that system (Culver, 2004). Where the nature of officials becomes obscure, it may become difficult to assess the borders of particular legal systems, and novel descriptive approaches may need to be devised. It remains to be seen whether these e-participation devices are utilized sufficiently to warrant further attention.

## FUTURE TRENDS: E-GOVERNMENT AND LEGAL THEORY TOMORROW

E-government has not yet caught the full attention of legal theory. Yet as the developments discussed above approach maturity as technologies and services, it seems this situation may change as e-government advocates will look beyond the current focus on business transformation and provision of transactionally secure citizen-focused services. In leading jurisdictions such as the United Kingdom and Canada, the first generation of e-government service delivery is nearly complete as more than 70% of central government services have been put online. At the same time the problem of the digital divide is changing. No longer are governments faced with the analytically simple problem of providing all citizens with Internet access. As technologies converge and Web-enabled mobile telephones become widely available, the new problem becomes one of a choice of the kind of government services and citizen engagement practices to offer to citizens. The next step is unlikely to come easily. In jurisdictions such as the United Kingdom, early enthusiasm and novel roles such as Andrew Pinder's service as "E-Envoy" have diminished. As Pinder's replacement charged with finding a new role for e-government in something other than an "E-Envoy" unit, Ian Watmore has become head of the newly founded E-Government unit reporting to the Minister for the Cabinet Office—a far less striking title, and an office clearly within an existing policy silo and not "running loose" as an innovator. Yet even as leading e-government states examine missed targets and cost overruns and consider whether e-government is worth the trouble, there are reasons to believe that e-government developments relevant to legal theory will continue to develop in ways which have substantial implications for thinking about legality, legal system, citizenship, and law's capacity to obligate.

Business transformation and operational efficiency do not exhaust the ideal of citizen-centered governance, and in cross-department standard setting, information sharing, and service we may see the core of e-government's "second generation" benefits for citizens. Portal-based service delivery has required departments and agencies to share responsibilities and to develop joint policy-making capacity. At the same time calls for increased public consultation on government policy have been matched by nongovernmental demonstration that the Internet is a powerful tool for provision of information, gathering of opinion, and coordination of political pressure. Supporters of Governor Howard Dean of Vermont, for example, used the Internet (http://archive.deanforamerica.com/) to convey information, raise funds, and via blogging to provide for debate amongst

Dean supporters. Similarly, protests against the WTO meetings of 1999 in Seattle were organized via continuously updated Web sites, and "smart mobbing" or text messaging of virtual and physical meeting points for protesters. These developments suggest that the empirical preconditions exist for significant changes to the roles of legal officials both elected and nonelected, and perhaps changes in the role of citizens as well. Historically evident gaps between legal officials' and citizens' knowledge of law and policy issues are rapidly closing as the Internet makes information available to all at the time and place of their choosing. This fact, taken together with the call for increased public consultation on policy issues, suggests that the role of representatives could change very rapidly, and the extent of that change ought to be subject to legal theory's scrutiny. From the perspective of descriptive jurisprudence, researchers might ask whether such changes amount to a functional shift in the identity of legal officials, as well-known international nongovernmental organizations (NGOs) bring their knowledge and influence to bear on relatively ill-informed local officials seeking public input on policy. Normative questions arise also. What does respect for autonomy require us to do for citizens if we have ICTs which enable an increase in the quantity and quality of citizens' interactions with elected representatives? Can the duties of elected representatives remain as they have traditionally been?

Questions about interaction between citizens and officials in law-making and law-varying practices do not stop within the boundaries of the state. As the European Union and the North American Free Trade Agreement (NAFTA) states form stronger economic and social ties, some states are recognizing regional claims to distinct identity. This practice can be seen in the United Kingdom's consideration of a Northeastern Assembly to join the nationalist-inspired assemblies of Scotland and Wales. As citizens are increasingly able to conduct business and maintain political allegiances via electronic means and without regard for time or distance, questions of cultural and state membership will be raised in new ways, and the protection (and sometimes surveillance) of digital personae may raise complex descriptive and normative questions regarding the nature and use of such personae. Perhaps more interestingly, and more clearly connected with orthodox legal theory, it seems possible that the way e-government makes time and distance irrelevant to commerce and political participation may also make the state appear less relevant as an object of allegiance. If the state becomes little more than a geographically or linguistic placeholder for specific treaties and cultural icons, it will no longer be clear that law's capacity to obligate resides in the state's demand for allegiance (and promise of protection).

## CONCLUSION

The second generation of e-government service delivery may soon cross national boundaries to fit economic and social regions, and e-participation may follow suit. If e-participation blooms to become the de facto basis for national and international policy making and additionally informs the content of legal norms, the sheer numbers of participants and shared practice establish an international law making, varying, adjudication, and enforcement system whose legality is beyond question. E-government on the back of the Internet might yet be the author of international law, and legal theory may become primarily global in focus, leaving the state an historical rather than logical creature. Change of this magnitude would certainly amount to a revolution in legal theory. Early attempts in legal theory to gauge the impact of incremental changes tend to suggest that legal theorists are preparing to engage the revolutionary change e-government may bring to the nature of government, methods of governance, and relations of citizens and officials to law and government.

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## KEY TERMS

**Descriptive Legal Theory:** descriptive, explanatory, or otherwise nonjustificatory study of theoretical or general dimensions of law, legal system, and law's normative force in general and in specific departments of law, for example, international law, criminal law, tort law, environmental law, and so forth.

**E-Consultation:** most narrowly in the context of government relations to citizens, use of ICTs to enhance or replace attempts to solicit commentary and often discussion of proposed policies, legislation, or other commitments, often deployed in an attempt to demonstrate government accountability to citizens and to generate trust in government's decision-making process. More broadly, use of ICTs by government officials to provide information, solicit commentary on set options, or solicit novel options for policy or legislation.

**E-Petition:** an ICT-enhanced, typically Web-based, petition typically providing the terms of the petition, information related to the petition, signatures, and commentary, all accessible at the time and from the place of viewers' choosing.

**Normative Legal Theory:** morally, politically, theologically, or otherwise evaluative study of theoretical or general dimensions of law as described in the context of descriptive legal theory. Normative legal theory seeks simultaneously to understand and to evaluate legal phenomena, typically insisting that the act of understanding is necessarily simultaneously an understanding of that phenomena in light of its point or purpose.

**Silo:** metaphorical reference to vertical chains of authority and responsibility in government; in operation characterized by absence of sharing of problems, resources, authority, or responsibility despite apparent advantages to doing so.

# E-Government at Supranational Level in the European Union



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## INTRODUCTION

The term "e-government" became part of the political vocabulary toward the end of the 1990s. Previously, with the onset of new technologies, it found its place in the wider "semantic container," the information society. To respond to the United States and Japan's economic challenge, the European Commission drew up a "White Paper on Growth, Competitiveness, and Employment: Challenges and Ways Forward to the 21st Century" (the so-called Delors' White Paper). The construction of the IS is considered one of the five fundamental priorities of the Union to create a "common information area" based on ICTs and telematic infrastructure. E-government was the key element of significant community programmes (i.e., IDA [Interchange of Data between Administrations] and TEN-TELECOM [from 2002 renamed eTen]).

A decisive step toward the development of EU policies for e-government came with the approval, in June 2000, of the Action Plan "eEurope 2002: An Information Society for All." Guidelines were fixed for greater use of the Internet, and the initiative "Government online: electronic access to public services, [which] aims to ensure that citizens have easy access to essential public data, [...] [and, in order to improve] efficiency in the public sector, will require a re-thinking of internal organisation and of electronic exchanges between institutions" (Council of the European Union & Commission of the European Communities, 2000, p. 22).

A few months previously, based on numerous EC documents, the Council of Europe of Lisbon indicated an ambitious objective for the European Union: "to become the most competitive and dynamic economy based on knowledge in the world, capable of achieving sustainable economic growth, creating new and better jobs and more social cohesion." The so-called "Lisbon strategy" to permit Europe to recover the delay accumulated compared to the U.S., was intended to guide community policies up to 2010. It is in this context, interwoven with different and often conflicting pressures (economic competition and social cohesion, market logics, and the language of rights) that action plans are formulated and policies for e-government implemented in Europe.

## BACKGROUND: E-GOVERNMENT BETWEEN MARKET-POLITICS

The context of e-government in Europe is in the dynamic framework of three key issues:

1. The globalisation of the economy and the challenges posed by competitors on the global market
2. The construction of a European identity (enlargement, constitution, the existence of different models for European development and issues relative to the democratic deficit of the EU)
3. The exponential growth of the ICT sector and the Internet

E-government represents a core issue in these areas (i.e., effective implementation should lead through the integrated use of ICTs (3) and together with organisational change, to economic advantages for the public and private sectors (1), and a greater integration of the "European system" (2)).

The vision of e-government at EU level is quite differentiated. The EU strongly promotes open markets and competition while maintaining commitment to specific principles of the European public law tradition and human rights (embraced by the Fundamental Charter of Human Rights, integral to the EU constitutional framework). These factors have significant implications for e-governments policies, which embody the institutional expression of values such as human dignity, participation, and transparency (Van Cuilenburg & McQuail, 2003) to be safeguarded when implementing e-government solutions.

There is evidence that the development of e-government, more than acting as a catalyst for the processes previously described, has played the role of dependent variable. Thus, European strategies for e-government have been determined by economic and technological considerations rather than social or cultural factors.

If "the simultaneous existence of three divergent approaches—the EU liberal market model, the EU public service model and the EU national-cultural model—to the Information Society confers a unique character on the European communications market" (Venturelli, 2002, p.

79), policy decisions or policy perspectives have ended up being "*mainly technologically and/or commercially driven*" (Servaes & Heinderyckx, 2002, p. 98). Support for this view comes from the structure of many Community position papers (from the Delors White Paper to the Green Book on the Information Society of 1997), where a preference for deregulation and liberalisation endows the private sector with a much larger role (Kaitatzi-Whitlock, 2000) than the public authorities, which retain the residual role of "establishing new rules for the game" (Commission of the European Communities, 1994).

There have been remarkable repercussions on the development of e-government. The Commission has in fact left ample margins for Member States action, not only in terms of the principles of subsidiary and decentralisation, but also in the legal area. The Amsterdam Treaty (1997) gives the Commission no legal authority to intervene in relation to the public administrations of Member States. Consequently, any changes that concern the public administration cannot be imposed *top-down*, but must be *bottom-up*. The EU context is neo-liberal and increasingly market-oriented, although the form that this takes at national level is rather more differentiated than might be suggested (i.e., each country to its own specificities) determined by national political objectives and administrative traditions.

The EU has developed a new form of governance to tackle these new challenges: the open method of coordination (OMC) a soft-law instrument which allows the Union to fix guidelines which Member States must then translate into specific policies and benchmarking systems.

## CONSTRUCTING A EUROPEAN E-GOVERNMENT MODEL

Clearly, a coherent and united European Union policy on the issue of e-government does not yet exist, and no single document expresses the strategies pursued by the Commission. However, by analysing the documentation produced, it is possible to locate specific elements that enable us to outline a European model of e-government. Among the most significant documents, are "e-Europe 2005: An Information Society for All"—the continuation of the action plan "e-Europe 2002," "The Role of E-Government for the Future of Europe," and "E-Government in Europe: The State of Affairs," presented at the European Conference of Cernobbio (Italy) in 2003 (Leitner, 2003).

European e-government appears to be characterised by the following elements:

1. Close attention is paid to the technological and infrastructural dimensions: viz. in eEurope Action Plans, where reference is made to initiatives "[t]o stimulate the use of the Internet" and to create "a cheaper, faster, secure Internet" (Council of the European Union, Commission of the European Communities, 2000, p. 2) as well as for the diffusion "of broad band infrastructures" (Commission of the European Communities, 2002)
2. From the centrality of technical issues, interoperability emerges as an important factor: "[s]tandardisation in technology and harmonisation in legislation are just two ways to achieve this" (IDA, 2004, 24). Standardisation in organisations, infrastructure, procedures, and above all in semantic codes and legislation is needed, to encourage safe and clear interaction between Europe's public administrations. The Commission's working paper "Linking up Europe: The Importance of Interoperability for E-Government Services" (2003) and then an actual framework document, the "European Interoperability Framework for pan-European E-Government Services" (2004) is in this direction
3. By decentralising the context of decisions and policy implementation, in line with the principles of subsidiarity and regionalisation (reiterated in the White Paper on European Governance), the role of states, regions and municipalities is exalted. The declared objective is to enhance territorial and cultural specificities, although the legal limits posed by the Treaty are also relevant here
4. The preference for open source software, compared to proprietary brands: this is motivated by the need for interoperability and to reduce costs, although object of much criticism (CompTIA, 2004). This controversy has been fed by the confusion made in specific documents between open source software and open standards

Clearly, on the political plane, the most problematic issue is the reconciliation of objectives two and three (i.e., finding an uneasy (but necessary) balance between the *top-down* standardisation and *bottom-up* enhancement of territorial and cultural differences). These dynamics risk producing *top-down* policies centred on technology and a fragmented *bottom-up* policy concerned with decentralisation:

*Member States' preference for administrative autonomy has to be balanced against the Union's need for effective and uniform implementation. […] The European context suggests that administrative convergence is more likely to follow from attractiveness than from imposition.*

*Convergence is also more likely to be an artefact [sic] of substantive policies than the result of a coherent European administrative policy.* (Olsen, 2002, p. 6)

To identify areas of intervention of EU e-government policies, the measurement approaches that have been adopted are useful. The EU aims to measure "the percentage of basic public services available online." Member States have agreed to a common list of 20 basic public services, 12 for citizens and eight for businesses. Progress in bringing these services online will be measured using a four-stage framework: (1) posting of information online; (2) one-way interaction; (3) two-way interaction; (4) full online transactions, including delivery and payment.

Public services for citizens are:

1. Income taxes: declaration and notification of assessment
2. Job search services provided by employment centres
3. Social security contributions (3 out of the following 4):
   - Unemployment benefits
   - Child allowances
   - Medical costs (reimbursement or direct settlement)
   - Student grants
4. Personal documents (passports and driver's licences)
5. Car registration (new, used, and imported cars)
6. Application for building permits
7. Declarations to the police (e.g., in case of theft)
8. Public libraries (availability of catalogues, search tools)
9. Certificates (birth, marriage): request and delivery
10. Enrolment in higher education / university
11. Communication of change of address
12. Health-related services (e.g., interactive advice on the availability of services in different hospitals; appointments for hospitals)

Public services for businesses are:

1. Contributions paid by employers
2. Corporation tax: declaration, notification
3. VAT: declaration, notification
4. Registration of new companies
5. Submission of data to statistical offices
6. Customs declarations
7. Environment-related permits (including reporting)
8. Public procurement

The aim is to achieve a seamless e-government, and every European public administration must, in theory, deliver all public services online. However, it is clear from the various official documents, that e-government in Europe risks being reduced to the delivery and use of 20 public services online.

By identifying this list of services, the EU has attempted to negotiate a difficult balance. Consequently, emphasis is often on the administration (e-administration) rather than government (e-government). This means "neutralising" the process, attributing to it a lesser political relevance. Moreover, it is not considered that different views of e-government produce different impacts on the enjoyment of old and new fundamental rights (privacy, security, access, freedom of expression, *habeas data*) by citizens. As Strejcek and Theil (2002) state, in relation to changes in the balance of values that shape e-government policies, implementing e-government solutions can cause a conflict with the European Convention of Human Rights (ECHR), which should be integrated into policies. Clearly, no neutral model of e-government can exist.

The route pursued by the Union seems to be dictated by the legal limits imposed by the Treaty on the Commission's room for manoeuvre: the only option appears to be delineating a framework on e-government, leaving the development of Action Plans and local specifications to the States and Regions.

The fragmentation of EU-level policies, highlighted by the redundancy of bureaucratic and executive layers (see Table 1; Alabau, 2003) plus a "bottom-up fragmentation" deriving from the different approaches and objectives associated with each national context is the outcome. An example is "life events" that fall within the range of the twenty essential public services. As underlined by IDA, "in relation to life events there is currently no common set of life events mutually agreed between Europe's public administrations. The eEurope initiative identified a set of 20 basic public services for benchmarking. Among the Member States, wide divergences exist on what are considered life events, with, for example, Italy identifying 15, Ireland making do with 10, while the UK has 12" (IDA, 2003).

## TOWARD A "EUROPEAN ADMINISTRATIVE SPACE"

Clearly the future scenario is determined by the Lisbon (2000) objectives. Through initiatives such as IDAbc (Interoperable Delivery of Pan-European E-Government Services to Public Administrations, Businesses, and Citizens) and eEurope 2005, EU policies will continue to be "technologically and commercially driven." However, "what can be recognised from the many initiatives and

*Table 1. Summary of main bodies implementing the e-government policy of the European Union (Adapted from Alabau, 2003)*

| SUMMARY OF MAIN BODIES IMPLEMENTING THE E-GOVERNMENT POLICY OF THE EUROPEAN UNION | | | | | |
|---|---|---|---|---|---|
| **Body** | **Origin of Funds** | **Treaty Basis** | **Policy** | **Amount** | **Period** |
| **Directorate General Information Society** | | | | | |
| **Directorate A.** Information Society Strategy and eEurope | MODINIS Programme. Pending of approval. | Art. 157(3). Title XVI. | Industrial Policy. | Between 20 and 25 M Euros. | 2003-2005 |
| **Unit C6. e-Gov.** Directorate C. Components and sub-systems. Applications. | IST Thematic Area. Research and Technical Development. Framework programme funds. Decision 1513/2002 of 21 June 2002 | Art. 166. Title XVIII. | Research and technological development policy. | Between 30 and 35 M Euros | 2002-2006 |
| **Unit D6. eTen.** Directorate D. Communication Networks, security and software applications. | Trans-European Network Funds. Regulation 1655/1999 of 19 July 1999. | Art. 156. Title XV. | Trans European Networks Policy. | 37.5 M Euros | 2003 |
| **Directorate General Enterprises** | | | | | |
| **Unit D2. IDA.** Networks between Public Administrations. Directorate D: Services, tourism, new technologies, and design industries. | Interchange of data between administration programme. Trans European Network Funds. Decision 2045/2002 of 21 October 2002 and Decision No. 2046/2002 of 21 October 2002. | Art. 156. Title XV. | Trans European Networks Policy. | 74 M Euros | 2002-2004 |

strategies toward e-government is a huge demand for holistic approaches going far beyond present-day technological developments" (Wimmer, 2002, p. 94). There is renewed interest, on the part of the Commission, in the demand for services and for citizen-customer needs and expectations regarding public services. We can find this trend both in eEurope 2005, where the task is to ensure that public services are fully available on line and actually used, and in the evolution of the IDA Programme, which has shifted over recent years from back-office issues to the delivery of services.

It is too early to say whether this will be a consolidated trend in the future. Significant initiatives albeit at a preliminary stage, such as a Web Portal for EU administration, are in act. This project, by the European Commission IDA Programme in December 2000, is an unprecedented opportunity for creating a "European Administrative Space" that favours citizens mobility within the EU and the constitutional right to good administration, as established by the Constitution, and drafted by the Convention on the Future of the Union. This policy, furthermore, is in the wake of the initiatives launched by the European Commission to facilitate innovative developments by means of European-wide projects such as the "eGov: an Integrated Platform for Realising On-line One-Stop Government" (Wimmer, 2002).

The different types of constitutions that co-exist within Europe influence e-government processes, as far as the implementation of the Treaty is concerned as well as Members' attempts to conserve autonomy. These are focal issues in the context of support for open source (OS) software. A review of statements accompanying OS policies and legislation at national, regional, and local level suggests that acquisition decisions are influenced by considerations such as dissatisfaction with the leading U.S. role in software development and the hope that the use of open source will encourage indigenous software industry, as well as the desire to reduce the cost of information technology.

These issues are the responsibility of the public administration, and the Commission merely provides incentives for the use of OS software. There is a risk that the many solutions adopted by national and regional decision-makers will have repercussions for the development of a European Administrative Space, which remains the main objective of e-government policies for the future.

## CONCLUSION

The reinforced position of e-government in the 2005 Action Plan shows that e-government is currently one of

eEurope's biggest challenges. The 2002 Action Plan aimed to bring government services online. The second task, addressed by the 2005 Action Plan, was to ensure that these services are widely used and that interactive services are available. Here, greater emphasis is on demand-side issues, such as awareness, confidence, security, and public service. The e-Europe mid-term review draws attention both to the progress made in areas that are considered crucial to the development of the Information Society and on the key challenges for the coming years. A slowdown in the growth of e-government services has been noted by a number of commentators, and this seems to characterise the development of e-government policies worldwide (Accenture, 2004). The causes are several, not least the scarce financial resources destined for the implementation of these policies (circa 0.05% of the total; Alabau, 2003). However, the limits on the Commission's interventions on the PA issue is much more significant: the OMC favours multi-level governance, but is also provoking dispersion in decision-making and content fragmentation. The Union is pursuing coherent and uniform strategies fixing guidelines, frameworks and standards, but must leave policy and strategy specifications to lower institutional levels. "Balancing the need to respect the diversity of internal structures of the Member States and the need for Members to adopt legal measures necessary to implement the Union's legally-binding acts is part of the general search for a balance between unity and diversity, common projects and national autonomy" (Olsen, 2003).

This explains the constant attention addressed by the Union for more infrastructure, an apparently neutral ground on which the Union is authorised to intervene. The Commission's desire to have a political role in the strategies and content of e-government is visible in many cases. The evolution of the IDA programme, which passed in a few years from the "exchange of data between administrations" (IDA) to the creation of a "network of administrations" (IDA II), right up to the development of "pan-European services of e-government" (IDAbc) is a case in point. The range of action has gradually gone from technological and infrastructural issues to the strategic running of front-office services. A key issue is how e-government policies can promote economic growth and improve European social and political democratic identity (Servaes & Heinderyckx, 2002). The process of legitimisation of the European project does not circulate merely through the flow of ideologies or rationalities of government, but also through instruments and practices (Barry, 2001). Pan-European services can give a substantial impetus to the Internal Market and its associated freedoms, as well as to European Citizenship, but wider and more informed debate of these issues is crucial (Centano, Van Balen, & Burgelman, 2004).

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## KEY TERMS

**E-Administration:** The use of ICTs to support communication and information transmission within and outside the P.A.

**eEurope Initiative:** Launched by the EC—on 8 December 1999—"e-Europe: An Information Society for All." The initiative focuses on 10 IS priorities, from education to transport and from healthcare to the disabled for all Europeans.

**IDA:** Interchange of Data between Administrations. This Community Programme under the European Commission's Enterprise Directorate General supports the implementation of EU legislation, from internal market regulations to consumer and health policies, facilitating through ICTS information exchange between public administrations across Europe.

**Inter-Government Partnership:** Horizontal or vertical formalised cooperation between governments on the same level (e.g., local authorities, or between governments at different levels) (e.g., local and regional or national authorities, respectively).

**Interoperability:** Ability of ICT systems and business processes to exchange data and to enable sharing of information and knowledge.

**Open Source Software:** Any computer software whose source code is either in the public domain or, more commonly, is copyrighted by one or more persons/entities and distributed under an Open-Source licence such as the GNU General Public License (GPL).

**One-Stop Government:** A single point of access to electronic services and information offered by different public authorities. Online one-stop government requires that all public authorities be interconnected and that the customer (citizen, private enterprise or other public administration) be able to access public services via a single point, even if these services are provided by different public authorities or private service providers. It further requires that the customer be able to access these services in a well-structured way to meet his/her perspectives and needs.

**Portal:** Any well-used gateway to the Internet, especially those sites designed to serve as a "front door" or first page when accessing the Web. Portals typically provide large catalogues of other sites, powerful search engines for locating information and e-mail facilities or other Web services.

**TESTA I and II:** Trans-European Services for Telematics between Administrations. The IDA TESTA project started in 1996 and entered its second phase (TESTA II) early in 2000. It responds to the growing need for the exchange of information between European administrations. It envisages a European inter-administrative IP network, similar to the Internet in its reach and universality, but dedicated to inter-administrative requirements and providing guaranteed performance levels. Implementation of this vision requires a broad coverage, including all EU Member States, EFTA countries and EU accession candidates, once they have joined IDA. It also requires the connectivity to reach all administrations wishing to participate.

# E-Government Construction and China's Administrative Litigation Act



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## INTRODUCTION

E-government has become a part of our society gradually as a derivative of the current information society. To adapt to international affairs, the country's economic development and social progress, China should expedite the transfer from a traditional superintendent government to a modern service government by building an e-government. However, there are many obstacles in the way of popularizing e-government. The "validity" and "reliability" of e-governance are key problems, because China's administrative legal system hasn't made specific laws and regulations on e-governance administration. In the current situation, it is of great and practical importance to discuss the new characteristics of e-government administration and understand the influence of information on the administrative legal system.

## BACKGROUND

Constructing an e-government means building a public-centered e-government through reorganizing the government by information technology, improving the public service, building up public participation, publishing government affairs and democracy, accelerating government office automation and, overall, sharing information resources and enhancing the efficiency of public administration, the rationality of public decision-making and the flexibility of government organs.

The e-government network project was sponsored by more than 40 Ministries and Committees of the State Council in January, 1999, in China. Driven by the central government, the Web sites of Ministries and Commissions of the State Council are getting more in numbers and richer in content. There is new progress in many fields, such as the issue and delivery of policy and information service. That is, the issue of the government announcements on the Internet, the application for import and export qualification, the collection of the suggestions on "The tenth five years' plan of the state economic development." The overall government information system will be accomplished by executing an e-government project, paperless documents, network decision-making and electronic public-service. E-government becomes a window through which the government displays its perfect image and provides its service for citizens, corporations and other organizations.

Since 2000, local governments accelerated their steps of e-government construction. For example, by the end of 2000, Beijing had already set up the public information platform and government affair network. A series of information databases that can handle the information of enterprises, population and city planning have been established. One hundred twenty-three branches of the Beijing government own the Web sites in the Capital Public Information Platform. In addition, at the beginning of 2001, Beijing Municipal stated that it will generally realize the network transaction of the examination and approval, administration, and service business for the enterprises and public within the next 2 years and realize electronic and network offices inside. Based on these, the e-government network system with perfect function, reasonable structure, high-speed broaband and interactive administration network will be completed by the end of 2005. The government affair informatization will be realized by using interactive artificial man-machine administration.

It is reported that there are nearly 4,000 fully qualified Web sites marked with ".gov" in different levels of local government in China. Most country-level governments have established their Web sites or home pages on the Internet and issued government affair information through the Web. Some developed areas did better than other regions. The network coverage of each district, county and bureau in Beijing is 94%. Sixty-five counties and cities in Jiangsu Province and 276 government organs in Shandong Province have their own Web sites. Henan Province has its network in four levels of governments (province, city, county, and countryside). Especially, Guangzhou established the high-class Government Information Network exchange platform, as well as a three-level government information network system, including city, district and street. At present, there are 56 Web sites, about 20 e-post offices and more than 300 databases for internal information and public service. The information resource exchange and sharing system has become shaped

in this way. Network offices include the administration of city planning, industry and commence, customs, taxation affairs, finance, human resources, employment, police affairs and population. For example, District Tianhe in Guangzhou completely automated its office and document transaction network.

## FUTURE TRENDS

Administrative litigation, namely judicial review, is not only one kind of legal supervision system for government administration, but also a kind of administrative legal relief system for the administrative counterparts. Such a supervision mechanism in national institutions aims at supervising the authority of the government so as to guarantee citizens' rights.

The construction of e-government brings challenges to China's legal system while benefiting the administrative counterparts and enhancing the efficiency of the government.

### The Challenge of the Legality Censor of the Administrative Procedure

The most important symbol of administration by law is the legality of administrative procedures. Administrative procedures contain the manner and steps of administrative action. Legality of the administrative procedure is a very important statutory requirement of the courts maintaining administrative action. E-government makes things complicated.

Whereas the control mechanism is weak in maintaining citizens' rights and interests, many countries constituted the administration procedural law to protect the legal rights and interests of the administrative counterparts, restrict the administrative action and prevent the government from abusing administration authority after World War II. Although China doesn't have a uniform administrative procedure act, many regulations on administrative action do exist. Each country's regulation on the manner of administrative action normally requests that the administrative action must be sufficient and positive in content.

"The parties should be informed in written form except some special cases" (Huaide, 2000, p. 232). Written form is different from oral form. Some solid materials are used as the medium to act on people's sight. Because paper is good for carrying, writing and preserving, it becomes the most popular writing material. Written form in our daily life refers to the paper used for writing. In the law documents, that is, "written form." Written form accords with the exact requirements of modern administration, so administrative law requires administrative organs to execute administrative action in written form, and this requirement turns out to be one of the essentials for the effectiveness and validity of administrative action. For example, Spain's Administrative Procedure Act (no. 55) prescribes that administrative action must be in written form unless other more suitable expressions or demonstrations are allowed. China's Administrative Sanction Law (no. 39) also makes it clear that the administrative sanction should be a formal and written one. Furthermore, in no. 3, the administrative sanction is action of nullity if it doesn't follow the legal proceedings. Using the written form can not only remind the government to be careful with its decision-making but also protect the legal rights and interests of citizens, corporations and other organizations who can prove the administrative dispute by bringing forth the written form of administrative action to the court when they are suing. Constituting law in written form becomes an obligation of the administrative organs.

E-governance is supported by an information network, so electronic documents come out. There are many differences between an e-document and a written one: (1) the automatic readability of information; (2) the reliance on an electronic system, as the e-document relies on certain electronic hardware, operating system and application software; (3) the non-information of the carrier. The paper document together with the handwriting and seal proves the original identity, while an e-document has no such identification; (4) flexibility of handling information. People can edit e-documents freely without being noticed. Most current administrative law and regulations do not prescribe e-government administrative action, so it is very difficult for the court to check the validity of the e-government action in the administrative litigation.

There will be more and more administrative cases concerning e-government. The legislative draft of administrative procedures stipulates that administrative organs have free judgment right on using e-administration while the administrative counterparts have free will. How to balance the relationship between administration and law is a new problem in front of the court. For example, if the administrative organ employed an action that the counterpart disliked, the party considered that the administrative action had no law gist and appealed discharging. What would the court do? According to the administrative litigation act, the court should discharge the administrative action when the procedure is transgressing. Discharging will frustrate the construction and improvement of e-government because it does accord with the national policy and the trend of law. But there is no gist for not discharging. Above all, we had better perfect the concerned legislation and justice explanation as soon as possible while having enough mental preparation for meeting unexpected trouble in the checkup of administrative litigation validity.

## The Challenge of Confirmation of Administrative No-Action

According to the Administrative Litigation Act of China (no. 11 item 8), an administrative counterpart has the right to prosecute when administrative no-action violates his or her personal right and property right. "Some explanations about the execution of 'Administrative Litigation Act of the Peoples' Republic of China' by highest court" (JianMiao, 1998, p. 165) specifically prescribes that the party has the right of prosecuting administrative no-action when the administrative organ has not replied nor made a decision within 2 months after it was requested, except for additional prescription of laws, rules, regulations and other criterion. The "administration admission law" under discussion has a specific prescription on the application sent by e-mail. If the administrative organs fail to open the e-mail sent by the counterpart, they cannot know the details of the application and contact information of the counterpart. That will result in the failure of informing the counterpart of changing the style of application in time. In this situation, the counterpart may figure the administrative organs have not replied or made a decision within the legal time limit and prosecute the administrative no-action. It is worthwhile to research how the court confirms the administrative organs make no-action for the application of the counterpart.

## The Challenge of E-Document Censor as Evidence

The evidence of administrative litigation refers to all data or means that can prove the truth of administrative cases. The counterpart submits an admission application to the administrative organs by e-mail before the deadline. If the administrative organ does not reply or make a decision within the legal time limit, the counterpart can consider that the administrative no-action affected his rights and interests and lodge administrative litigation to the court. In such a case, the court must censor whether the administrative organ received or opened the e-mail. The original carrier, style, time and maker of the e-document must be checked, too. Besides, the court must synthetically censor the e-document evidences, make an objective and fair judgment, confirm the relation between evidence and law case, and eliminate irrelevant evidence with judiciary morality, logic reasoning as well as living experience. Compared with traditional written documents, e-documents have some additional characteristics, such as being changeable, traceless and public. It is possible to change e-documents for certain illegal purposes. It is difficult to identify the original files, because e-documents are traceless. Publicity makes the danger of tampering with e-documents greater. They challenge the judge's professional qualification.

## The Challenge of Administrative Compensation Caused by E-Government

One of the purposes for e-government construction is to publicize governmental affairs. In other words, the counterpart is able to obtain information about law and regulation through a network. If some wrong information in the Web site brings property loss to the counterpart, it may result in a dispute on administration compensation. Since the government is obligated to issue the correct information, according to the principle on depending and protecting, the counterpart ought to be compensated for losing due to wrong information issued by the government. With the advance of our e-government construction and the development of an opening administration system, more and more government information will be issued through the government Web site. With the development of the economy and improvement of information construction in China, more and more citizens can access governmental affairs through a network expediently. The number of administrative compensation litigation on wrong information issued by the government will rise gradually. The rights and interests of the counterpart can be supported by the administrative compensate case cognizance. The government must be aware of the responsibility of issuing correct information and reducing mistakes on the Web site.

## CONCLUSION

The administration manner has so many new characters with the development of information technology in modern society. Such characters have an impact on the present administrative litigation system, more or less. Some can be forecasted preliminarily, some cannot. For sure, the government must execute administration under the law to establish the nomocracy. The development of e-government is no exception. The construction of e-government has become one necessary strategic measure facing the tidal wave of information. It is one important part of administration and nomocracy construction in the 21st century. We have to reflect on it in advance as well as envisage and respond to all kinds of new challenges and problems about e-government.

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## KEY TERMS

**Administrative Action:** The action of administrative subject, according to administration law, refers to the action of state administrative agency and its personnel.

**Administrative Compensation:** In the case of unlawful administrative acts that infringe upon a citizen's personal rights and unlawful administrative acts infringing upon the property rights of a citizen, the liability is undertaken by the administrative agency.

**Administrative Litigation:** The suit that, if a citizen, legal person or organization considers that its lawful rights and interests have been infringed upon by a specific administrative behavior of an administrative organ or its personnel, is brought before a court in accordance with the law.

**Electronic Document Censor:** The censorship through the way of electronics communication.

**Readability of Electronic Information:** The quality of information presented in electronic form that makes it easy to read and understand.

# E-Government Development in Nanhai City, China



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## INTRODUCTION

Nanhai is a small city which belongs to Foshan City (a district can also be called a city in some cities of China) and lies in the central part of Guangdong province. It is in the hinterland of Pearl River Delta, close to Hong Kong and Macau. It was in 1995 that the city began to develop e-government. In September of 1996, it became one of the first cities that started to operate the Internet in China. Since 1999, the city had transferred into the period of Internet application. It became the national experimental field of an informalization process in 2000 and of an e-government application project and national information security project in 2001. However, since 2002, lots of problems have been appearing due to overemphasis on the construction of an information infrastructure and noticeable projects. Chinese e-government has been at the stage of a realistic period, with data shared among departments since 2000. Some weaknesses of the appraised projects have been appearing because of short service for urban development and the requirements from the city administration. Therefore, this case is just a description of the periodical success and would be a problematic case of the process of Chinese e-government.

## BACKGROUND: E-GOVERNMENT IN CHINA

E-government can be described as being divided into three periods since the 1980s in China: that is, office automation (OA), sector administration with IT, and e-service of government. Each period is marked by the following.

### Office Automation (1980s)

The primary computer system used by the government was designed to work for economic statistic data analysis before 1980. Since the 1980s, the government had started to set up OA systems, which were also used at the provincial level. Most of the systems were organized by the secretariats in provincial governments. During that period, the systems were popularly used in the inner governments; the staffs of the systems were either full time or part time. Many governmental departments, such as industrial, commercial, revenue, financial, police departments and so on, had began to establish their own systems since that time.

### Sector Administration with IT (1990s)

With more users of OA, there were some special IT branches in the governments (Technical Division, Information Centers, etc.). Commercial departments, revenues, financial bureaus, and police bureaus built their special application systems. Three "Gold" projects had been started since 1993: Gold-Bridge, Gold-Gate, and Gold-Card. The projects were invested by the central government. The main parts of the projects were basic infrastructure, which would provide data transferring (Gao, 2004). This period was the primary stage of e-governance.

### E-Service of Government (2000-Present)

When the Internet became popular, governance-online was promptly carried out in China. The Chinese government carried out the Governance-Online Project in 1999. Going with the project, the number of Web sites whose domain names were ended up with "gov.cn" had reached 11,764 by December 31, 2003. The number of governmental home pages was more than 10,051. The ministries (26 of 29) and commissions of the state council have set up their own Web sites. Among them, nine of the home pages had an English version, 12 Web sites could provide services online, and 90% of the home pages had either an information board or querying database service. Additionally, 70% of prefecture cities' home pages had service windows for public affairs (Xue & Huang, 2004). Since

that time, some integrated e-governance projects have started to be planned and implemented. The projects were composed of e-service for social insurance in which five types of insurances were integrated into one. There was an official approving process on one Web site, city smart cards on one, integrated economic database, population database, urban geography information system, urban emergency commanding system, and so forth.

The development of e-government has a close relationship with the rapid growth of the economy in China. The characteristics can be represented as the following: Among basic infrastructure, information releasing, and data exchanging, the two former have been done better than the last one.

When the segmentation of e-government is divided into vertical and horizontal categories, the sector special service in the vertical segmentation is much better than the local e-governance in the horizontal one.

- The force to use IT comes mainly from the administrative command of government.
- The adopted IT techniques in China are almost on the same schedule with developed countries.
- The levels of e-government are obviously different among different regions and different departments.

The city of Nanhai just started OA systems earlier than other counties. It happened at the same time of national and provincial experiences. Therefore, there were some pioneer projects which got praise from the state.

## THE MAIN STRATEGY AND SITUATION OF NANHAI E-GOVERNMENT

Nanhai e-government is a typical example of local e-government in China. It has started the stage of sector administration with IT since 1995, which was the leading one with good infrastructure and good vertical and horizontal links in China. The features of Nanhai e-government were the connections of networks both in vertical and horizontal links. This created the fundamental framework of e-government. Through e-governance and e-finance management, a lot of sectors were also encouraged to use IT. These were successful strategies for Nanhai e-government.

### Vertical Link

A vertical link has been achieved at the city, town, and village levels. All the administrative organizations have built up the office local area network (LAN). Eighteen towns (or districts) of the city have established finance and account centers to manage their affairs online. On the other hand, other cities' information could not be encouraged by the government because the e-governance lagged behind the city information.

### Horizontal Link

At the same time with vertical links, all the departments have also been connected with the Internet in Nanhai. The governmental information network center and data exchange center have been set up. Some projects about management systems, such as family planning, land management, court register judgment, social insurant services, health system, and so forth, have become the typical ones all around the province and the country. For example, the application of GIS and GPS with the map of scale 1:500 provided the digital tools to optimize the allocation of land resources. On the other hand, horizontal links seldom happened in other cities, even in some metropolises. This will be the future situation of e-government in China.

### Using E-Government to Deal with Governance and Financial Affairs

An office automation system and finance management system had been established in Nanhai when the e-government program started. The financial settlement center was built in 2001. It could centrally manage the administrative organizations which let the local account open to the public. Public bidding was carried out on the network with some projects like pharmacy purchasing, engineering projects and land auction, and so forth, in Nanhai. In 2002, Nanhai first used "public assets management information system" to manage the public assets on the Internet in China.

### E-Governance Promoted the Informalization Process of the Whole City

E-governance promoted the civilian information in Nanhai city. Up to now, e-government had covered both city and town levels. Following this progress, all the 250 villages in the city had been connected by optical fibers; all the families could connect to each other through the Internet; the IT penetration rate to traditional industries had reached 65%; and all the schools have built computer rooms (Liang, 2002). As a result, long-distance education, e-hospital, selecting radio or TV channel by Internet, e-

shopping, and so on, had been popular in the city. On the other hand, other cities' information could not be encouraged always due to be the lagged e-governance.

## THE CONSTRUCTION EXPERIENCES OF NANHAI E-GOVERNMENT INFRASTRUCTURE

Nanhai has had a great success in e-government in China. It is because the mayor put information construction as the main strategy of the city development, which was known as "leadership project". During the whole process, some typical models and experiences were available to be shared with other cities in China.

The construction of e-government infrastructure was totally managed by the mayor.

There was a special organization (information commission) to manage the construction of information in the city. The commission consisted of three sections: an expert panel, information office, and network center. Among them, the expert panel was responsible for decision making; the information office was responsible for the planning and management; the network center was responsible for technical issues. At the same time, all the departments have built related organizations at different levels. Therefore, the information systems were harmoniously operated from high to low levels. This broke through the shortcomings of lack of special organization and made Nanhai enter the normal schedule of information progress.

### Unifying Infrastructure Construction

Two ways were adopted to unify the infrastructures. "Integrating three systems (television, telephone and computer) into one" and "one database network with spatial data, attributes data and network data" have been originally required to build a physical network on the basis of a public communicative network (Zhou, 2004). For a smooth process, the Nanhai information network center was invested by the science and technology office, post office, broadcast and television office. The center was responsible for planning, constructing, and operating the network of the whole city. As a result, the stock system was adopted to coordinate different benefits to avoid the disadvantage of disputes among departments. This allowed the information resources to be shared all over the city.

### Government-Driven, Market-Induced and Enterprise-Operated Model

The administrative system would be changed by a network with the government-driven, market-induced and enterprise-operated model. First, the government played only the role of collaborating and coordinating among different sectors and set up a public network to make a platform for the city information. Secondly, enterprises themselves developed the application systems. Thirdly, information construction was invested by different investors (foreign capital, folk capital, and all kinds of risky funds). Dozens of IT enterprises had grown up and become gradually a main part of the city information since 1995 (Gu, 2004). All the above factors promoted Nanhai into one of the first group of information cities in China during the second period of China.

## PROBLEMS OF NANHAI E-GOVERNMENT

Nanhai is only at the level of county administration which belongs to Foshan City. Like other cities in China, the legislation system of e-government is not perfect; the traditional ways are the obstacles; there is inefficient coordination among departments; it is lacking of IT professionals in governments. Among these problems, openness of information, benefits among departments, and the bottlenecks of experts are the key problems in Nanhai. Some of the problems are the ones which are ubiquitous in other cities in China; others are the unique ones which only happen in Nanhai.

### Two Issues about Information Policy

There is almost no independent intellectual property product in China. The computer system of e-government, including hardware, software, operating system, network administrative software, application system, database, firewall, network connect equipment, router, server, and modem are all imported from abroad. Almost all the TCP/IP protocol, computer CMOS chips are INTEL products; and the software is basically WINDOWS or NT. There are big gaps of system security and security protocol between China and the developed countries. This impacted on the network security in China.

Some questions are without answers. First, who can decide the contents of open information? Second, how to ensure the efficiency and accuracy of the opened information? There is no law or rule to deal with the two problems in Namhai until now. This problem belongs to the national level.

The reason that the standard of e-government is lagging behind the application is the lack of a uniform planning guide for local governments and departments. In January of 2002, a project team to standardize e-government was organized in Beijing by the information

office and standardization commission of the state. The team is now working on some standards.

## Interest Division Slows Down the Progress of Systems Integration

E-Governance and traditional governance exist simultaneously. This resulted in some conflicts. The suppliers of the constructing platform are multisources; the standards of hardware and software are different; different systems are difficult to integrate.

There are two approaches for the construction of e-government in China. One is horizontal connections among provincial governments. Another connection is inner sector links at different levels. Each of the connections has different planning systems. Therefore, it is difficult to share data between the two segmentations. The typical segmentation is among the three networks. The broadcast network, telecommunication network, and computer network are isolated systems. It is impossible to share data among them. For example, the broadcast department refused to be integrated with the telecommunication system because their market shares overlap. Another issue is the unreliability of benefits. There was a proposal in 2000 which let departments invest in developing IT technology. But finally, it was rejected because the departments did not like to invest more without specific corresonding income.

## More IT Professionals Required

With the rapid growth of information technology, large quantities of technical professionals are required. But a shortage of IT professionals and low IT skills of civil servants make the challenge of promoting e-government in China great.

First, many high-tech talents have gone abroad. In Beijing, for example, 82% of graduates of high-tech majors at Tsinghua University have gone to America, and the number was 76% at Peking University. At the same time, more and more high talents have joined in overseas-funded enterprises or foreign R&D organizations (Zhou, 2004). The loss of IT talents was especially critical, which has accelerated the shortage of talents for e-government in China.

Secondly, the civil servants cannot use information tools properly and so could not fulfill the demand of e-government. Although 65% of 17,000 servants in the central government have master certifications, the proportion is relatively lower in local governments. Some highly educated servants still do not have good computer skills.

Since Nanhai is only a remote area in China, it has always been hard to attract talents and information enterprises. The lack of techniques and talents would restrict sustainable development of e-government in the future. The bottleneck of IT professionals is another critical issue that Nanhai must meet.

## Unsustainability of Financial Resources

E-government is a rolling system with sustainable development. This needs continued financial support. The infrastructure of e-government was invested in by the local government, with less revenue from business. After the set up of the OA system, the project would be ended. There was no other income to finance the sustainable operating of the system. On the other hand, e-government serves the local economic development which provides demand for e-government service. Nanhai is a township city with weak economic power and requirements of business. This is the typical obstacle of local e-government in China.

# CONCLUSION

The success of Nanhai e-government mainly resulted from the administration of the city government from 1990 to 2000. It is city government that made the information strategy the number one in Chinese cities. As a result, most of the advantage resources were invested for the construction of city information infrastructure. The core of the whole informalization process is e-government. This made Naihai the leading city in China.

The importance of using e-government is much more than the construction itself. During the construction period, Nanhai was the pioneer. When the service of e-government is emphasized, the weakness of poor usage appears. In fact, e-service at local governments would be more important than that at the upper ones, which will become the windows to connect enterprises and the public. Hence, emphasizing the e-service at the local level should be the main issue for the transition of the administrative system in China.

Therefore, using the Internet as a service tool is more important than construction itself. It also indicates that it is even more difficult to change people's habits than to import the techniques.

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## KEY TERMS

**CMOS:** CMOS is a widely used type of semiconductor. CMOS semiconductors use both NMOS (negative polarity) and PMOS (positive polarity) circuits. Since only one of the circuit types is on at any given time, CMOS chips require less power than chips using just one type of transistor. This makes them particularly attractive for use in battery-powered devices, such as portable computers. Personal computers also contain a small amount of battery-powered CMOS memory to hold the date, time, and system setup parameters.

**Geographical Information System (GIS):** "GIS is one kind of information system that handles spatial data. a set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world for a particular set of purposes" (Burrough, 1986, p. 6).

**Global Position System (GPS):** GPS is a satellite navigation system. It provides specially coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity, and time.

**Gold-Bridge:** It is a program of constructing basic infrastructure of information in China. It includes projects of backbone network, satellite communication network, mobile Internet, fiber network, Internet phone, Internet information service, and technical reform network.

**Gold-Gate:** It is a customs network. It includes an information system with OA and legislation system in ports.

**Gold-Card:** It is a project of constructing a digital bank card. It includes various IC cards in different fields. For example, bank, telecommunication, transportation, commerce, travel, social insurance, family planning, taxation, and so forth.

**Governance-Online Project:** Since 1999, the central government has designed specific ways for investing in e-governance and adopted specific performance criteria to encourage the progress of e-governance at local governments. This program was planned all over the country and was called Governance-Online Project.

**Horizontal Segmentations:** This is an administration system at the same administrative level. For example, there are business commissions, agriculture commissions, industrial commissions, and so forth. which belong to Beijing government. It is difficult to be coordinated with each other because different commissions have to follow the upper departments of the central government.

**Leadership Project:** All the process of information construction is directly led by the mayor, including the investment, project design, test, and so forth. As a result, the resources for the construction can be easily controlled by the program team. The team leader may be the mayor.

**Local Area Network (LAN):** LAN is a computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves.

**Office Automation (OA):** The use of computer systems to execute a variety of office operations, such as word processing, accounting, and e-mail. Office automation almost always implies a network of computers with a variety of available programs.

**Vertical Segmentations:** This is an administrative system with the same department at different levels. For example, business department of the state, business of the pr of the province, business bureau of the county, and so forth. All the business administrations are in the same managing system from upper ones to lower ones. Different departments will be different even though they are in the same province or county.

# E-Government Development in the Caribbean



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## INTRODUCTION

While in theory, the benefits of e-government are numerous, global experience to date indicates that in reality they remain much more elusive. Given e-government's high impact on good governance and on the promotion of progress in developing countries, in order to better enable communities to benefit from e-government, it is important that the most adequate approach to the transition of a country or of a number of countries to the information society be identified in order for key issues to be addressed expeditiously, correctly, and effectively for an e-government that is at once as comprehensive as possible but also sustainable and meaningful.

This is particularly true for a region such as the Caribbean, which already came late to the assimilation of the industrial age paradigm and which still has to determine its role in the global information society as well as its digital age. While it is common belief that for the majority of countries e-government development is more efficiently and more effectively targeted through national programs tailored to specific needs and characteristics, this is not considered to be the case for countries in the Caribbean region.

Over the last five years, an unprecedented international cooperation for administrative reform and e-government capacity building has taken place in the Caribbean region (i.e., Anguilla, Antigua, Barbuda, the Bahamas, Bermuda, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts, Nevis, St. Vincent, the Grenadines, Suriname, Trinidad, Tobago, Turks, and Caicos Islands). Such an effort has involved many regional and international organizations (e.g., the United Nations, the European Union, the World Bank, the Interamerican Development Bank, the OAS, etc.); a lot of work has been accomplished to assist countries in enhancing the application of ICT to government functions in order to advance public sector reform, improve government services, enhance knowledge management and decision making, and promote economic and social development.

This international cooperation was carried out through a rich mix of ministerial consultations, working group meetings, meetings of experts, informal consultations, research and development, and country surveys. The rationale behind this kind of intervention was the conviction shared within the international community that a regional approach would permit dealing with the various issues related to e-government development more efficiently and more effectively.

## BACKGROUND

Acutely aware of policies and programs already being implemented at the national level, sharing the common goal of targeting the regional need for strengthened connectivity as a tool for greater prosperity, and with the support of international actors, Caribbean countries have agreed on having collectively drafted and endorsed agendas, strategies, and action plans for e-government development in the region1. The willingness to regionally address e-government development and implementation lies in the idea of gathering countries to work with regional organizations and agencies in order to develop cooperative and collaborative programs that would permit the lowering of overall budget costs related to e-government development and to gain greater efficiency at building infrastructure (Marcelle, 2004; Carr, 2004); to avoid problems and dissipation caused by uncoordinated, overlapping, and, in some circumstances, sporadic efforts and initiatives (Lederman, Maloney, & Serven, 2005); to facilitate the availability of a unique source of information cutting across individual nations for the international donors interested in the region; to put countries in a position where they can share knowledge and expertise (Kagami & Tsuji, 2002); to achieve greater equity between rich and poor countries (Murelli, 2002); to generate a Caribbean regional pride and a constructive competitive ethos that provides countries with mutual and moral support as well as growth of self-confidence in the face of shared challenges and difficulties (Kagami & Tsuji, 2001).

Although the numerous results achieved over the past few years through regional initiatives support the previously mentioned themes, it is important to consider that there still are many voices claiming how a regional approach is likely to be too challenging in a region that, in terms of population, is comparable to Argentina but with 20% of its area, and whose surface is similar to

Ukraine but with all of the blessings and problems of being a small island (Hilbert & Katz, 2002). Those sustaining such a position argue that in a context of different economic, social, political, and business characteristics, the Caribbean region shows great levels of heterogeneity, which inevitably reinforces the national focuses and weakens the regional perspective, thus making the implementation of a regional program for e-government development a highly demanding if not unachievable task (Hewitt, 2003).

Nonetheless, both at the regional and international levels, it is widely recognized that the adoption of a regionally coordinated approach to the conceptualization and implementation of ICT policies, to the reform of the legal and regulatory framework, and to the development of the organizational and infrastructural changes can facilitate the process of addressing and reducing the digital divide and can accelerate the integration of the Caribbean into a knowledge-based society (Murelli, 2002). Furthermore, the author believes that if the regional path can be regarded as a recommendable alternative for other regions worldwide, it appears to be an unavoidable choice for the Caribbean. This is a strong conviction that was matured and reinforced through extensive and substantial experience acquired while implementing e-government initiatives teaming up with Caribbean representatives from the governments and from the civil society and with leading world experts on ICT and e-government.

Following are thoughts devoted to some of the main arguments supporting this perspective on the utility of undertaking regional alliances for e-government development in the Caribbean.

## THE PERSPECTIVE OF A REGIONAL APPROACH

### Lacking Assets

The lack of financial resources in a large number of Caribbean countries is one of the main compelling reasons that over the past years have induced these countries to opt for a regional approach. Common belief is that it can facilitate the pooling of resources regionally accessible or of those made available by the international community.

Besides the fact that e-government projects often are implemented in Caribbean countries, where the enabling legal and regulatory frameworks are not in place and where the necessary policies and organizational structures have not yet been adopted or established, most of the countries also deal with insufficient assets and financing.

The situation is worse when e-government development is perceived as wasteful by the scarcely aware political class or by the barely informed civil society, who argue that it requires the engagement of substantial amounts of financial and human resources but does not result in the optimization of the government's operations and does not target citizens' high priority development objectives. Such allegations often are translated into political decisions that mandate a reduction of the funding for e-government. Ironically, these claims appear to be present more commonly within those Caribbean countries where e-government development is already limited by the lack of financial resources and political support. Thus, the sustainability of the accomplishments already achieved most likely is endangered, and the chances for future development are most certainly limited.

Moreover, on the financial side, evidence shows that the situation is aggravated as a consequence of the high heterogeneity of IT and e-government-related policies, laws, and regulations existing in the region. In fact, the majority of Caribbean countries appears to have undertaken many of the tasks related to policy development and implementation (e.g., adoption of strategies and action plans), legal and regulatory framework reform, and infrastructure and hardware and software upgrade in isolation from each other. Therefore, few are the cheap and readily available off-the-shelf software packages, and the need to develop unique programs restricts even more the capability of poorer countries to place services online.

By proceeding independently of each other, Caribbean countries increased the reciprocal costs of e-government development and enhanced the chances for wasting financial and human resources. Thereby, they somehow robbed each other of the opportunity to achieve economy of scales that would decrease the per-unit cost of official government Web sites or that would decrease the official cost of developing or acquiring applications within specific areas of e-government (e.g., e-accounting, e-taxation, e-procurement, e-justice, etc.). In light of this, the pooling of resources that facilitates the lowering of the overall budget costs related to e-government and the subsequent greater efficiency at building infrastructures constitutes the first argument that explains the rationale behind the largely supported idea of the utility to undertake regional alliances for e-government development in the Caribbean.

### Partnerships

Besides the need to mobilize essential resources in order to finance the establishment of an Information Society, the case for a regional approach to e-government development in the Caribbean also relates to the fact that the promise of e-government to potentially transform the way activities are run, services are delivered, interactions take

place, and information and knowledge are shared cannot be realized fully unless partnerships are created. If it is true that partnerships within and between countries are needed because e-government development cannot be the responsibility of the government alone, then experiences have proven that such a generic assumption fits even more in a context of small islands, drawing heavily from partnerships to overcome national incapability and to help governments achieve what they cannot accomplish alone.

The current situation evinces how some Caribbean countries have been more powerful than others in gaining international support through bilateral cooperation. However, the present circumstances also clearly show that the bilateral path of cooperation has not proven to be the most efficient one. As a matter of fact, if some countries lag behind due to the lack of support, then those that have succeeded in attracting aid often have focused on specific areas (e.g., e-commerce), losing sight of the global perspective (i.e., implementation of policies, laws, regulations, etc.). Therefore, they may have developed highly sophisticated applications but did not properly address key issues, thus hindering the development of a more coherent, balanced, and meaningful e-government.

In this context, the development of any regional strategic document into the reality of connectivity requires Caribbean governments to cooperate among themselves and with international organizations. Private sectors' energies, for instance, must be harnessed in providing for necessary broadband information networks and suitable applications, while governments ensure the legislation of appropriate policies and regulatory institutions to guard against private monopoly power and supplement the market to ensure access for the poor. Finally, the collective endeavor to address e-government development regionally would provide international donors that are interested in the Caribbean, one place to find information that cuts across individual nations so that the cooperation and coaction of a mix of main actors would be facilitated to the highest benefit of the recipients.

## Mutual Learning

Amid other reasons supporting the case for a regional approach to e-government development in the Caribbean is the argument that, thanks to the regional networks, Caribbean countries would avoid having to reinvent the wheel. Each country needs a speaking partner to learn from and with which to be able to share its experience; because no Caribbean country can be self-sufficient, each one needs input from the others in order to learn from experiences of trial and error within the region.

We should not forget that some of the challenges of a successful implementation of e-government consist of reengineering the internal processes, restructuring the public services, creating innovative citizen relations (Moore, 1998). The fact that small and large islands share similarities with regard to their political, economic, and social systems makes the case for regional cooperation even stronger. Such a conceived effort builds on the awareness of different needs as well as deep and common trust and on the belief in mutual benefits coming from a regional cooperation that would allow the countries to learn faster and better, to share experiences, to pool knowledge and expertise, to take new ideas on board, and to exchange good practices.

## Avoid Widening Existing Disparities

Among other things, Information Technology (IT) presently is transforming the way we access and share knowledge and information; it opens new vistas for humankind and offers possibilities to broaden and to accelerate the global integration of information networks, economic activities, and political as well as cultural pursuits (Zhen-Wei Qiang & Pitt, 2004). Therefore, while reconstructing the basis of national economic power, IT holds a great potential to change the global balance of power and for reducing the knowledge gaps both within developed and developing countries as well as within rich and poor countries of a same developing region. Precisely, casting a shadow on several inviting prospects are the asymmetries that still afflict the progress of information societies (Haacker & Morsink, 2002).

In relation to this, one of the principal causes of the asymmetries produced by the technological process in the Caribbean is the widening divide between those that actively can access and participate in global information networks and those that cannot. In consideration of the fact that the ability to utilize the information available on the Internet and, consequently, to translate it into knowledge for productive activities has become a critical factor; it is of pivotal importance to try not to increase communities' isolation or to enhance the digital divide within the region while developing e-government.

This supports the reasoning in favor of the adoption of a framework for regional cooperation within the Caribbean, which alleges that it would allow the reduction of the existing regional disparities with regard to the connectivity. Also, by placing countries in a position where they can share knowledge and expertise and by enhancing the linkages between national and regional organizations that work on similar objectives, the process of consultation, information sharing, and collaboration on joint projects would facilitate intra-institutional communication between regional cooperation institutions and their constituencies (Bayoumi & Haacker, 2002).

## Regional Agreements for Greater Equity

In line with the just mentioned argument encouraging a Caribbean regional approach to e-government is the importance of regional agreements in order to achieve greater equity between rich and poor countries in the region (Basdeo, 1989). Presently, e-government is not equally implemented within the Caribbean, and because of this, inequalities in critical success factors, such as the level of leadership, policies, laws, regulation reforms, strategic public investments, and investments in education and connectivity, may further increase without deliberate actions and improved coordination. A regional approach to e-government development undertaken in a phased manner can help to address these disparities, enhance the capacity of the less digitally advanced countries, and build a better knowledge infrastructure for the 21st century (Hoyte, Rainford, & Thomas, 1989).

## FUTURE TRENDS

In the Caribbean, pilot projects can help to establish the groundwork for productive forms of cooperation among member states. These should aim to increase the effectiveness of information exchange, launch common actions, and initiate cooperation (e.g., regional Internet exchange, regional electronic payment, coordinated border control system, etc.). In addition, harmonized ICT policies should facilitate the creation of larger markets and economies of scale, take steps to put in place policies and institutional frameworks that promote investment in a converged market, and support the development of cross-border connectivity. There is a strong need to expand the communication infrastructure in order to help to meet development goals, especially as the Caribbean regional economic community moves toward economic integration, establishing mechanisms for cooperative action by countries to harmonize national policies and strategies and to promote regional telecom buildout (Rao, 1995).

Any form of integration requires communications and networks, and the application of ICT is a particularly appropriate field for regional cooperation, in particular through the creation of joint mechanisms for developing, consolidating, and marketing high-tech products and services such as distance learning programs and software, together with region-wide networks. Progress in some of these areas within the Caribbean has been hindered by the total absence of regional standards and regulations to support the integration of telecom services. This situation is reflected, for example, in the diversity of technologies and standards used in the mobile telephone industry, which is hampering the physical integration of systems and the cost reductions associated with the expansion of the regional market. These tasks, therefore, should be priority lines of action for the Caribbean regional integration process in the immediate future.

## CONCLUSION

If the Caribbean countries as a region want to shrink significantly the existing digital gap between strong and weak usage of e-government services in the future, and if they want to increase extensively their position in the regional ranking, then they have to take advantage of any available method of regional cooperation.

The author's purpose was to assert that regional cooperation not only constitutes an additional path to shape ways to promote sustainable economic, social, and cultural development of the Caribbean countries in the emerging Information Society and to create a common platform for the exchange of experience, know-how, and projects; but it is also a way to assure that the Caribbean will find and maintain its particular optimum transition path toward the Information Society, notwithstanding the discrepancies among the different horizontal layers, the diagonal areas, and the vertical sectors at the national level, which create a fast-changing and complex scenario requiring constant evaluation. Not only do the regional networks allow the Caribbean countries to remain informed in a global context by knowing what is happening at the regional level, but they also are the key to generate a Caribbean regional pride and a constructive competitive ethos.

Therefore, if regional cooperation and integration have proven to be good alternatives for many regions worldwide engaged in realizing the opportunities of e-government, then the analysis included in this article seems to show that there are enough arguments in support of the idea that a collective approach represents an inevitable strategy in order for e-government to be implemented successfully in the Caribbean.

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## FURTHER READING

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Word Bank. http://www.worldbank.org

Inter-American Development Bank. http://www.idb.org

Institute for Connectivity in the Americas. http://www.icamericas.net

UNDESA-Division for Public Administration And Development Management. http://www.unpan.org/lacwig

## KEY TERMS

**Best Practices:** The processes, practices, and systems identified in public and private organizations that perform a process or subprocess exceptionally well and is widely validated, codified, diffused, and recognized as improving an organization's performance and efficiency in specific areas in which they are shared with others in order to encourage reciprocity and knowledge sharing.

**Connectivity:** In IT terms, it refers to the ability to connect to or communicate with another computer or computer system, the Internet, or a Web site.

**Digital Divide:** The gap that exists between those who have and those who do not have access to technology (e.g., telephones, computers, Internet access) and related services.

**Economy of Scale:** The reduction in cost per item (unit cost) that results from large-scale production. The high capital costs of machinery or a factory are spread across a greater number of units as more are produced. This may be a result of automation or mass production; for example, in the car industry. Economies of scale also can be produced when entities (e.g., countries) that need similar services locate together, sharing the costs of their services; for example, in the case ICT acquisition and development.

**E-Government:** The application of Information and Communication Technologies within the public administration for the optimization of its external and internal functions.

**Good Governance:** The process of decision-making that is built upon transparency, accountability, the rule of law, and democracy.

**Information Technology:** Any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. The term *information technology* includes computers, ancillary equipment, software, firmware, and similar procedures and services, including support services and related resources.

## ENDNOTE

[1] The Regional Agenda for Connectivity was approved by the Ministers of the Caribbean Community (CARICOM) responsible for Information and Communication Technology during the 23rd Meeting of the Conference of Heads of Government in July 2002 in Georgetown (Guyana) (http://www.caricom.org). The "E-Government Strategy for the Caribbean" was adopted by the 5th Ministerial Consultation on Regional Cooperation for E-Government Capacity Building held in Barbados on June 17-18, 2004; which was part of a broader initiative for administrative reform and e-government capacity building in the Caribbean, implemented by the Caribbean Centre for Development Administration (CARICAD), CARICOM, and the Division for Public Administration and Development Management of the United Nations Department of Economic and Social Affairs (http://www.unpan.org).

# E–Government Development Trends



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## INTRODUCTION

Information technology is changing the role of government, its functions, and its power. The long process of transformation of public sector organizations and the applications of computer technologies have started the talk about electronic government.

In the last ten years, the debate concerning e-government has been the subject of various studies, promoting analyses, research approaches, and empirical surveys. Even so, there is still much confusion about the meaning of this term and the word e-government is often used in reference to e-voting, e-democracy, or e-administration. Therefore here we intend to provide the reader with some guidelines, trying to explain a concept that, although little more than ten years old, finds its roots in the ancient idea of the information society.

We can start by saying that e-government represents just a single fragment of the broad discourse about the impact of information technologies on society. It is not an administrative experiment but a permanent part of the governmental process. According to Jane Fountain's (2004) idea, we can define e-government as "the production and delivery of information and services inside government and between government and the public using a range of information and communication technologies" (para. 2). In this prospective, the Internet can be considered as a variable, which has been grafted onto the wider ground of factors leading to the transformation of government roles.

Moving from this point, e-government will be analyzed as an intersection of two main trends. The first of these is the overall transformation of public sector organization. In this respect, the Internet variable has to be considered in the entire process of the government reinvention that made scholars talk about a major new revolution after the industrial one. The second trend is the information society development, a process that started since the 50s catching very soon the interest of governments.

## BACKGROUND

Let's try, now, to observe the long process of modification, which, in the last 30 years, has involved the intrinsic nature of governments influencing their functions, structures, and processes. Welfare State crisis, economic, and ideological pressure, change of the public perception of government roles make United States and European scholars talk about *Reshaping the State* (Wright, 1994) and *Reinventing Government* (Osborne & Gaebler, 1992). A frame of general changes where the development of information technology becomes one of the main pressures leading to the transformation of government roles can be identified as such:

a. Creation of international markets, which has created problems of international and transnational administrative coordination, dimming governments identity and responsibility
b. Economic and fiscal pressure, which has caused problems of deficiency in public budget
c. Strong ideological prejudices of the new right theorists towards the state, *big government*, the inflated bureaucracy and the determination to re-plan State borders
d. Technological changes, explosion of information technologies that are strongly affecting traditional public bureaucracies and leading towards the introduction of the new public management (NMP)
e. General feelings of dissatisfaction and suspicion from public opinion towards governments. Although they have got various features in different nations, they share a common point, that is a charge of inefficiency, a lack of transparency and corruption against the public sector
f. Managerial revolution, which has strongly affected procedures and techniques in order to reach an upper degree of efficiency and flexibility. In fact, the proposal of a new public management (Hood, 1996; Pollitt, 1990) is based on the idea that most of the public sector problems are the results of bad management of governments (Peters, 1995)
g. Problems (only regarding European context) of coordination and regulation among different administrative cultures due to the process of Europeanization

Looking at these issues, it is easy to understand that information technologies are only a part of the wide series of changes involving all governments. But, at the present

time, they represent a flywheel for a deeper action of renewing. They are leading to the decentralization of the traditional functions concerning political/administrative direction of governments, aiming at a more flexible government structure, pushing a process that reduce discretionary bureaucracy.

In fact, the idea of *reinventing* an increment of the administrative effectiveness of a bigger responsibility of governors and of the efficiency of public administrations is regenerate since the 90s with the development of the modern computer science technologies. The new technologies and the Web make the government reform cheaper, faster, and better but bring about issues such as redesigning government structures and processes.

This is the reason why now it is important to take into consideration all the opportunities, challenges and problems that the "*e*" points out for governments: actually electronic government is more about government than about "*e*" (OECD, 2003).

## INFORMATION SOCIETY RESEARCH TRADITION AND E-GOVERNMENT

As the background analyses have shown, the importance of electronic media in governments began long before the term e-government appeared. Governments have always used new technologies as an instrument to improve the effectiveness.

The following pages will show that e-government is not only a segment of governments change but also a part of the larger discourse about information society. The studies on the information society began well before the e-government concept emerged: they started in the 60s, when the theoretical discussion developed different approaches on the production, elaboration, and distribution of information. Many scholars have discussed the development of the information and communication activity. The first was Fritz Machlup (1962), who pointed out that already in 1958 about 29% of the American gross national product was derived from what he defined as the "industry of the knowledge." In the same way Marc Uri Porat (1977) spoke about "the information economy" as a new field of the productive activity connected to the development of new technologies; Daniel Bell (1974) was the main theoretician of the post-industrial society; Peter Drucker (1998) and Alvin Toffler (1980) developed different aspects of information as a resource and Kennet Laudon (1986) with his *Dossier Society* put the first key matters on the development of new technologies.

If in the early 60s the analysis was concentrated predominantly on the American panorama, from the first half of the 70s until the beginnings of the 90s studies began to be expanded in other States and the initial interest for this type of theme began slowly to decrease. But the emergence of the Internet in the 90s focused the attention on the (global) information society with new actors and new situations (May, 2002).

The information society, driven by new technologies of information and communication, started a new revolution similar to the industrial one (Bell, 1974). In the governmental offices as in the factories, information technologies were introduced not only to increase productivity and profit, but also to ensure the managerial control on the productive process, to make the administrative procedure more efficient, to favor centralization and social control.

This is why the idea of an information society and a global society of knowledge interested governments and international organizations since the beginning. And they started to entrust to scholars and technicians hypotheses and projects of intervention.

In Japan in 1971, Yoneji Masuda was one of the authors of the national plan policy Jacudi (Japan Computer Usage Development Institute) for the bulky introduction of the new information technologies in Japanese society. In France Simon Nora and Alain Minc were the authors of the report on the information society *L'informatisation de la société* (1978). In the United States, Zbigniew Brzezinski, political theorist at Columbia University of New York and National Security Advisor of President Carter, was the main theorist of globalization. In his book, *Between Two Ages, America's Role in the Technetronic Era* (Brezinski, 1970), he outlines a global sight of the new society, defined "technetronic society"—a society established on technologies, particularly on information technology, and telecommunications—and introduces the idea of a "diplomacy of the net" that should replace the "diplomacy of force."

Today a growing number of non governmental organizations (NGOs) identify in the global information society a strong tool for economical development: examples are the *1998-99 World Development Report: Knowledge for Development* of the Word Bank (1998), the report of the United Nations *Knowledge Societies: Information Technology for Sustainable Development* (Mansell & When, 1998), and *Towards a Global Information Society* of the Organization for Economic Co-operation and Development (Oecd, 1997).

But it was in 1993 that a speech on the information society—after it had characterized for different years the policy on the economical development—took on a new development and became a part of the direct interventions of the government. On March 3, 1993, the American government during the Clinton administration developed the program of the *National Performance Review* (NPR)

with a double mission: *work better* and *cost less* (Osborne & Gaebler, 1992). It was a plan to reform public administration and to guarantee efficiency, effectiveness and responsibility of governments. In the initial report of the National Performance Review appears a paragraph in which emerged, for the first time, the expression "electronic government." However no definition was given for this term. The first definition was made four years later when, in the report Access America of the NPR, February 3, 1997, in which e-government was defined in reference to the use of information technology to perform or to increase the services of some governmental functions, mainly among the services directed towards the citizen.

The NPR program planned a thorough re-evaluation of two main areas, that of the analysis of implementation and of monitoring and measuring change, and it is in this context that the word e-government was introduced into public discussion for the first time. The idea of an electronic government, in fact, become part of the bigger discourse on *Reinventing Government* that started in the United States in the 70s and extend, incrementally, in all the nations. The goal was the decentralization of the key functions of internal decision-making for government decisions.

With the entrance on the stage of information technologies, in the 90s, the long process of reinventing was strengthened. There was an awareness that information technologies confer four main benefits to the reform process: economical benefit (producing the same results with lower a cost); increasing production (more outcome at the same cost); fast productivity (more outcome with equal costs and less time); improve the result.

E-government at first was used like a modern expression, a buzz word, and as often happens when a new limit comes to the attention of the public, different definitions of the concept came out as well as numerous attempts to scientifically legitimize the term. People started to apply the attribute *electronic* to different fields of new technologies and politics, causing confusion and lacking any real rigor, as well as adding very little to the sense of what was added by this new *electronic* factor.

In this way frequently, e-government has been seen as an administrative experiment rather than as a persisting part of the complex governmental process—often succeeding only in causing greater confusion between e-government and e-administration or e-government and e-democracy rather than developing any of the undoubted potential of these new methods of communication and implementation. Thus, the research on e-governments has moved in multi-directions. One aspect favors the position that enhances public administrations via information and communication technologies (ICT); an other aspect prefers the potential of ICT in developing more active citizenship and electronic democracy. In some cases, instead, the research reflects worries of certain scholars with regards to the increasing influence that the private sector approach has on the management of public resources, or the anguish about the threat to privacy by these new technologies, or more extreme apocalyptic images of an invisible State, without any power (Dyson, 1998; Tapscott, 1998). Several debates and works on this topic have also referred to e-government as a form of service delivery. This is not an incorrect assumption, but it does not represent the unique way to define e-government. It could appear almost restricting to consider e-government as a mere administrative experiment. In a more broad definition e-government can be considered as a governments' strategy, a new organizational model of the relationship between state, institutions, and citizens, and a new formula for the reinventing in which Internet becomes an important variable in to the widest factors that bring about governments to change.

## FUTURE TRENDS

The Internet creates a new arena or power for governments, and political and social scientists cannot neglect it. Pointing their attention on the central and strategic role of institutional actors involved and several problems that new technologies give rise to, scholars should go beyond the phenomenon of representation and dwell upon the knots it may cause. One of the main questions revolves around the role of the States, their functions of organizing, administrating, regulating, and controlling.

In the new globalized space, new actors are participating in the decision making process. The cooperation and interaction between State and public/private actors is increasing. Corporations, which own most of the technological know-how that governments are losing, represent a very strong reference point for governments. The Web symbolize a new arena to colonize, either for governments and corporations, where developmental countries—still waiting to acquire technological structures—become ideal markets to realize good profits. Then the open question is: are we in an electronic government era or are we rather going into a governing electronics era? Maybe modern technologies are deeply changing the government power and new actors are conquering more space in the decision making process. We cannot say exactly where these changes will bring us, but in the near future, it would perhaps be better to focus our attention not only on the changes in public administration but more on the new dynamics of power in the globalized political space and on what governments are doing for the construction of the "*e*" world.

## CONCLUSION

This article has observed the long process of modification, which, in the last thirty years, has involved the nature of governments. It has presented a frame of general changes where the development of information technology becomes one of the main pressures leading to the transformation of the roles of governments. However, according to how stated at the beginning, electronic government is more about government than about "*e*." New technologies are only a factor between many to enhance governments change. The real change is not the use of digital technologies in public offices but regards a new way of thinking for governments, a public space of power. Indeed, digital technologies create new arenas of power and interests that affect directional functions, government organizations, and control.

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## KEY TERMS

**Digital State:** The idea of a state government that leads the nation in adopting digital technologies to improve services delivery.

**Digital Technologies:** The term refers to the technologies used in the digital age, from audiovisual technologies to the computer and Web-based technologies. Digital technologies are used to improve communication and also to store information and effect on consumption of mass culture.

**E-Democracy:** The term refers to the use of the modern digital technologies to improve democracy. The Web is considered as an instrument to spread democratic principle of transparency, information, and participation of citizen to political life. The Internet creates a new public space—apparently free of strict rules—able to allow the citizens to communicate with everybody, express their own ideas and participate to democratic process.

**Information Technology (IT):** The term refers to computing and telecommunication technologies used to handle information, to process, store, convert, transmit and retrieve data.

**National Performance Review (NPR):** The National Performance Review is the Clinton-Gore Administration's initiative to reform the way the federal government works. Its goal is to create a government that "works better and costs less." It is about change in the way the government performs.

**New Public Management:** It is a new philosophy to describe how management techniques from the private sector are being applied to public services. Its intention is not privatization, but the fortification of the state.

**Reinventing Government:** It is a process of government transformations and downsizing of the federal workforce started in the United States in the 70s and extending, incrementally, in all nations.

# E-Government for Building the Knowledge Infrastructure in South Korea

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## INTRODUCTION

New information and communication technologies (ICTs) enable rapid information flows, which reduce the necessity for face-to-face contacts as well as geographical barriers. These also create network-based societies (Castells, 1996). E-governments can contribute to the enhancement of network-based societies. In the last five years, governments have made rapid progress worldwide in embracing ICTs for e-government. By 2004, 178 of 191 member states of the United Nations had a Web site presence (UNPAN, 2004).

All e-governments focus on the use of ICTs for the full range of government functions. In particular, the networking potential offered by the Internet and related technologies enables them to transform the structures and operation of government. As a result, e-government can be a major enabler in the adoption of good governance practices (OECD, 2001a; Ronaghan, 2002).

Regarding the OECD's work on governance, there is a strong belief that effective governance is an important requirement for the achievement of economic, social, and environmental objectives. Moreover, the OECD secretary general set out a draft statement of governance priorities for the 21st century, which, in 2000, indicated the experiences of OECD countries in building democratic and prosperous societies.

In order to practice good governance, an e-government is regarded as a strategic implementation that identifies various objectives such as effective leadership, coordination and policy coherence, and efficient investment and financing (OECD, 2001a). Additionally, e-government is recognized as one of the most significant factors to strengthen national competitiveness, particularly in a knowledge-based information society. This also serves as an important enabler in order for a government to offer high-quality civil services at low costs. As a result, e-government not only contributes to the informatization of citizens and businesses but also improves the productivity and transparency of public administration (Bertelsmann Stiftung, 2002).

Advanced nations already have launched various government-driven initiatives such as the E-Government Initiative in New Zealand and the U.S., and UK Online in the UK (Reeder & Pandy, 2002). Along with these advanced nations, South Korea also is consistently pursuing e-government initiatives with its world-class information infrastructure in order to transform the way of national governance (National Computerization Agency, 2002). The e-government project will bring about structural and procedural reform and is expected to serve as a springboard in order for South Korea to leap forward to become one of the leading nations in information and communication industries.

This article discusses which strategies the South Korean government focuses on and how it implements these in order to build the knowledge infrastructure. Furthermore, the article aims to analyze the methods of building the knowledge infrastructure based on ICT as well as the roles of the e-government to develop good governance.

## BACKGROUND

The development paths of building e-government in South Korea consist of three stages. The first stage of e-government began in 1986, when the government passed the Act on Promotion of Information and Communication Network Utilization and Information Protection. On the basis of this legal support, the project of National Basic Information System (NBIS) was first implemented. Later on, the project of Korea Information Infrastructure was initiated with a trend to build information superhighways in advanced nations, which started in the U.S. in the mid-1990s.

In the second stage, the government enacted the Framework Act for Informatization Promotion and the National Framework Plan for Informatization Promotion. This act and the plan were empowered in 1995. On the basis of this legal enforcement, the government began providing informatization services such as patent, customs, and procurement. As a result, the services evolved to a full-scale e-government by the end of the 1990s. Furthermore, the government appointed chief information officers (CIOs) in 1998 and continuously revised the National Framework Plan for Informatization Promotion to Cyber Korea 21 in 1999 (National Computerization Agency, 2002).

The final stage was an ongoing process that started in 2001. The government established the Special Committee for e-government in January 2001 in order to accelerate its efforts to implement e-government with maximum power. The members of the special committee were experts from the private sector and deputy ministers of related agencies. The special committee was under the presidency and has continuously supported and monitored key initiatives (Knowledge-Based

*Table 1. Development paths for building e-government (Author's adaptation based on Knowledge-Based E-Government Research Center)*

| Stage and Period | Major Framework |
|---|---|
| 1st stage (mid-1980s-mid-1990s) | National Basic Information system, Korea Information Infrastructure |
| 2nd stage (mid-1990s-late 1990s) | Framework Act for Informatization Promotion, National Framework Plan for Informatization Promotion, Cyber Korea 21 |
| 3rd stage (2001 - ) | Special Committee for e-government, Five-year Informatization Promotion Plan |

*Table 2. E-government key initiatives (Knowledge-Based E-Government Research Center, E-Government in Korea, 2003)*

| Type | Initiatives |
|---|---|
| Innovation of services to citizen and business | 1. Single window e-government (G4C)<br>2. Social insurance service portal<br>3. Home tax service<br>4. National e-procurement service (G2B) |
| Enhancement of administrative efficiency | 1. National financial information system<br>2. National education information system<br>3. Local government information<br>4. Personnel policy support system<br>5. E-approval and e-document exchange |
| Establishing infrastructure for e-government | 1. E-signature and e-seal<br>2. Phased implementation of a government-integrated computer system (BPR/ISP) |

e-Government Research Center, 2003) (see Table 1). The key initiatives consisted of three types and 11 initiatives. These 11 high-payoff initiatives were implemented and have been in service since November 2002 (see Table 2).

After the 11 major initiatives, the government plans to drive another initiative named Beyond e-Government, which contributes to providing a wide range of citizens' needs and various value-added services. As part of this initiative, the government launched a five-year informatization promotion plan, e-Korea VISION 2006, in April 2002. This plan focuses on qualitative improvement rather than quantitative expansion, and its aim is to become the leading nation instead of following other leading nations. The e-government, which provides customized online services and open administration, is emphasized as the core strategy eliminating redundant and overlapping processes as well unnecessary paperwork.

## VISIONS OF E-GOVERNMENT AS STRATEGIES FOR NATIONAL COMPETITIVENESS

The South Korean government has set its visions of e-government in order to increase productivity and transparency through the strategic use of information and communication technologies in the public sector. This ultimately will contribute to strengthening the national competitiveness and to positioning South Korea as an advanced nation. To realize these goals, the government formulated the following three strategic objectives of e-government:

1. **A Government that Provides the Best Administrative Services to Individuals:** All administrative institutions disclose the processing of civil affairs so that citizens can apply for and be provided with administrative services at home through an online single window.
2. **A Government that Provides the Right Support for Business:** E-government creates new businesses by establishing ICT infrastructure. In addition, it supports venture businesses and fosters human resources. Furthermore, e-government refines laws and regulations for establishing standards of e-business as well as for creating a safe online marketplace.
3. **A Government with Improved Productivity, Transparency and Democracy:** E-government enables paperless administration through the electronic data interchange (EDI) system, which enhances the productivity and efficiency in public services. Due to the EDI system, it is fully possible that the entire workflow is processed electronically. As a result, the transparency of administration can be improved. Moreover, bilateral communication between the government and citizens contributes to creating a democratic e-government (National Computerization Agency, 2002).

In reality, however, the level of e-government compared with other advanced nations does not seem to be as prosperous as planned. The level of e-government is measured by three global indexes such as the e-government index, the information index, and the transparency index. Among these indexes, South Korea was in a weak position, particularly in the field of government transparency (Ministry of Information and Communication, 2003). Therefore, the government set its specified targets in order to belong to the leading group in the year 2008 (see Table 3).

Due to the little impact of government reform based on the 11 e-government initiatives, the Presidential Committee on Government Innovation and Decentralization intensified e-government initiatives as a key national strategic task to reform administration and civil services. The reason for this is that the limitations of laws and regulations and old practices have not been fully changed, since they were based on an off-line environment. Accordingly, the e-Government Working Committee revised the visions and principles for e-government in May 2003 (see Figure1). In order to approach the visions, the government finalized the e-government roadmap to include four areas, 10 agendas, and 31 key tasks (National Computerization Agency, 2004).

## ACHIEVEMENT OF E-GOVERNMENT AND BUILDING THE KNOWLEDGE INFRASTRUCTURE

Despite moderate performance of e-government at a global level, the South Korean government has achieved a tremendous result in terms of a knowledge-based society. First of all, there are two major frameworks based on the 11 key initiatives toward the e-government. The first one is the informatization of public administration services, and the other is the integration of critical public administration services. The former consists of six programs, and the latter is composed of eight programs (National Computerization Agency, 2002). With these services, the government aims to reduce administrative costs as well as to provide citizens a better quality of life. In addition, it focuses on improving the quality of service and operational efficiency (see Tables 4 and 5).

The 11 e-government initiatives completed informatization on a government-wide basis in civil service reform, integrated procurement, and national financial information. These efforts resulted in the world's highest-rated IT infrastructure, particularly in the broadband network to more than 1,400 rural areas by the year 2002.

Informatization of departmental and functional unit operation is regarded as the advancement and enhancement phase. Moreover, the government starts to offer integrated online services such as reporting and making payments over the Internet. Therefore, it is safe to say that these services advance e-government to the upgraded level (National Computerization Agency, 2004).

In addition, it is widely expected that the demands on state services such as health, welfare, and education will increase in the mid-term future (Ducatel & Miles, 1995). In order to improve these services, the government has established a social insurance service portal and a national education information system.

E-government initiatives have contributed to building a knowledge infrastructure drastically in South Korea. Looking at the IT expenditure trend in the 1990s, the growth of capital investment increased from 6.9 trillion won in 1990 to 41 trillion won in 1999, which accounted for 3.88% and 9.40% of the GDP, respectively. In particular, the government and corporations invested in telecommunication and technological hardware. As a result, the total amount of investment in software was relatively small (National Computerization Agency, 2002) (see Tables 6 and 7).

During the financial crisis at the end of 1997, the investment in the IT sectors did not decrease, which indicated that the government strongly held these sectors as the key industrial sectors for the national economic growth. At the same time, the government decided on a heavy investment in these sectors in 1999, in which there was a 40.68% increase compared to the year before.

Due to the heavy investment in IT sectors, which is based on the strategy of resource concentration, the status of South

*Figure 1. Visions and directions for e-government (National Computerization Agency, Informatization White Paper, 2004)*

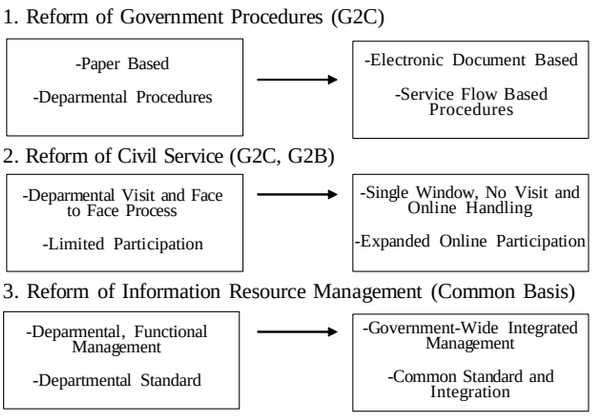


*Figure 2. Internet users per 1,000 people (2003) (International Telecommunication Union (ITU), International Informatization Index DB, 2004)*

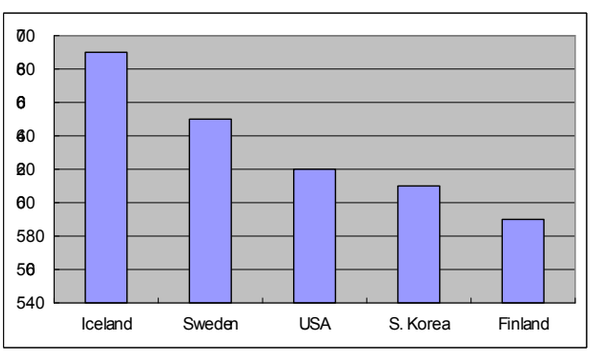


*Table 3. Present ranks of South Korean e-government and its targets (Ministry of Information and Communication, E-Government Roadmap, Republic of Korea, 2003)*

| Global Index | 2003 | 2008 (Targeted) |
|---|---|---|
| E-government index (UN) | 15th | In top 5 |
| Information Index (IDC) | 16th | In top 5 |
| Government transparency (TI) | 40th | In top 20 |

Korean informatization has increased continuously. As a result, South Korea is ranked in the world's top five, particularly in areas such as Internet users, broadband Internet subscribers, and CATV subscribers. These areas are regarded as key factors in order to realize a knowledge-based society and a knowledge economy (see Figures 2, 3, and 4). A knowledge-based economy is based on high technology

*Table 4. Results of informatization of public administration services (National Computerization Agency, E-Government in Korea, 2002)*

| Services | Achievements |
|---|---|
| Computerization of Passport Issuance | - **Reduced the waiting** time from two to three days to 20 minutes |
| Korea Intellectual Property Office (KIPO) Net | - **Increased online users** by an average of 430% (annually 3.3 million users)<br>- **Cutting costs** by 29.8 billion won (c. 29 million U.S. dollars) per annum |
| Computerization of Customs Administration | - **The world's first** end-to-end import/export declaration, acceptance, and release system<br>- **Reduced from two days to 2.5 hours** (four hours faster than the UNCTAD recommendation)<br>- **Annual savings** of 2.5 trillion won (c. 250 million US dollars) |
| One-Stop Service System for Export and Import Cargo (PORT-MIS) | - **Decreased the processing time** from two hours to two minutes<br>- **Annual saving** of 4.9 trillion won (c. 490 million dollars) |
| School LAN and Internet Access-ICT Use in Education | - **LAN construction** in 346 schools by 1997 (3.3% of the total schools), 4,902 schools by 1999 (42.8%), and 10,064 schools by 2000 (85.2%)<br>- **Connected** to the National Information Superhighway or Korea Education Network |

*Table 5. Results of the integration of critical public administration services (Computerization Agency, E-Government in Korea, 2002)*

| Services | Achievements |
|---|---|
| Government for Citizens (G4C) | - **Annual saving** of 1.8 trillion won (c. 180 million U.S. dollars) |
| Government Procurement Services (G2B) | - **87% of online transaction** in all trading activities<br>- **Key role** in the public and private sectors for stimulating online trading markets |
| Interconnected Information System for the Four Major Types of Social Insurance | - **Annual saving** of 5.4 trillion won (c. 540 million U.S. dollars) |
| Home Tax Services via Internet (HTS) | - **Annual saving** of 1.4 trillion won (c. 140 million U.S. dollars) |
| Informatization in Local Governments (Cities and Districts) | - **Completed 232** cities, countries, and districts throughout the nation<br>- **Reduced qualification screen services** from 21 days to three days |
| National Financial Information System | - **Real-time management** of imports, exports, earnings, and expenses<br>- **Annual saving** of 2 trillion won (c. 200 million U.S. dollars) |

manufacturing and knowledge-intensive services (Cooke, 2004).

## ANALYSIS ON E-GOVERNMENT IN SOUTH KOREA

The economic index of the IT industry shows that the production value in the IT industry has increased by an annual average growth rate of 18%, from 89.9 trillion won in 1998 to 205.4 trillion won in 2003. The share of this sector in total exports increased from 27.8% in 1999 to 29.7% in 2003, which accounted for 40.0 billion U.S. dollars and 57.5 billion U.S. dollars, respectively. This illustrates that the IT industry backed by the public and private sector's massive investment has risen as a major driving force for generating the nation's export as well as economic growth. As a result, South Korea takes a leading position in the fields of LCD monitors, semi-

*Figure 3. Broadband Internet subscribers per 100 households (2002) (International Telecommunication Union (ITU), International Informatization Index DB, 2004)*

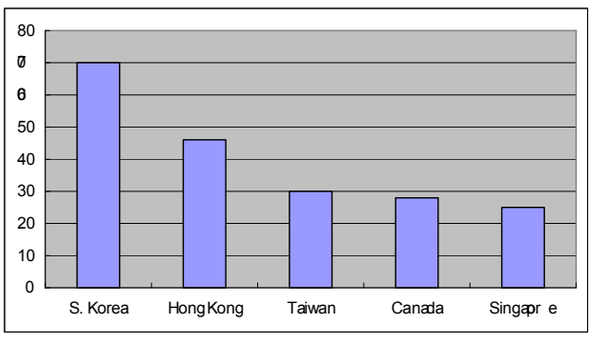


*Figure 4. CATV subscribers per 100 households (2002)(International Telecommunication Union (ITU), International Informatization Index DB, 2004)*

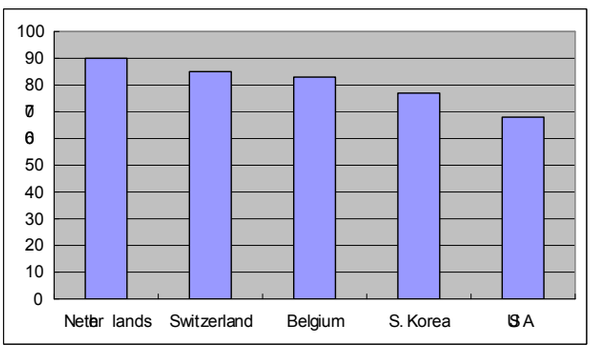


*Table 6. Trend of IT expenditure (unit: %, trillion won) (OECD, Science, Technology and Industry Scoreboard, 1999)*

| Category | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|
| IT Expenditure | 6.9 | 8.0 | 9.0 | 11.3 | 14.7 | 18.5 | 23.6 | 27.1 | 29.3 | 41.2 |
| Ratio to GDP | 3.88 | 3.71 | 3.68 | 4.06 | 4.54 | 4.91 | 5.64 | 6.23 | 6.56 | 9.40 |

*Table 7. Trend of IT expenditure by type (unit: %) (Computerization Agency, National IT Investment, 2002)*

| Type | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|
| HW | 22.98 | 22.06 | 22.11 | 23.11 | 25.09 | 29.12 | 28.84 | 25.87 | 20.69 | 24.69 |
| SW | 3.55 | 5.40 | 7.20 | 13.13 | 13.50 | 10.97 | 12.39 | 15.30 | 13.01 | 10.82 |
| Telecom | 73.47 | 72.55 | 70.69 | 63.77 | 61.42 | 59.91 | 58.77 | 58.82 | 66.30 | 64.48 |

*Table 8. Relative proportion of IT investment by sector and by type (unit: %)( National Computerization Agency, National IT Investment, 2002)*

| Category | | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 |
|---|---|---|---|---|---|---|---|---|---|---|
| Public sector | Telecom | 54.2 | 54.4 | 52.6 | 48.1 | 41.6 | 35.7 | 33.8 | 31.3 | 27.6 |
| | H/W | 4.2 | 4.3 | 4.9 | 5.8 | 6.7 | 8.4 | 9.5 | 10.4 | 10.8 |
| Private Sector | Telecom | 17.1 | 17.3 | 17.3 | 17.9 | 21.2 | 20.7 | 19.8 | 20.6 | 23.5 |
| | H/W | 24.5 | 24.0 | 25.3 | 28.3 | 30.6 | 35.2 | 36.9 | 37.8 | 38.1 |

conductors, and mobile phones (Ministry of Information and Communication, 2003).

In order to build the knowledge infrastructure, the government increased its investment on the telecom sector, particularly in the beginning of the 1990s, while private corporations focused on their investments in hardware during the same period. However, this trend changed after the mid-1990s. The government and private corporations started to keep a balance between the two sectors, although the government still preferred to invest in the telecom sector. By contrast, private corporations invested in these two sectors with a good balance (see Table 8). This indicates that the basic knowledge infrastructure for building e-government was established with a heavy investment on the government's side in the beginning of the 1990s, and the private corporations began to invest in the telecom sector after the mid-1990s in order to maximize their business profits.

*Table 9. The informatization budget of the government (1998–2002) (unit: billion won) (Ministry of Planning and Budget, Annual Budget 1998-2002)*

| Sector | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Amount of the budget | 715 | 856.2 | 1,215.5 | 1,469.2 | 1,608.6 |

*Table 10. World Top 10 National Informatization Index (1996 – 2003) (International Infromatization Index DB, 2004)*

| Country | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Sweden | 95 | 96 | 96 | 94 | 91 | 94 | 93 | 96 |
| Denmark | 92 | 91 | 95 | 94 | 92 | 92 | 91 | 96 |
| USA | 99 | 99 | 99 | 99 | 99 | 99 | 98 | 95 |
| Switzerland | 88 | 87 | 88 | 89 | 90 | 89 | 99 | 94 |
| Iceland | NA | NA | NA | NA | NA | NA | NA | 91 |
| Canada | 92 | 92 | 91 | 92 | 91 | 88 | 79 | 89 |
| S. Korea | 52 | 55 | 58 | 70 | 78 | 79 | 80 | 89 |
| Netherlands | 86 | 85 | 89 | 92 | 93 | 93 | 89 | 86 |
| Norway | 99 | 99 | 97 | 96 | 93 | 92 | 89 | 86 |
| UK | 74 | 72 | 76 | 79 | 81 | 80 | 78 | 85 |

*Table 11. World Top 10 National Informaization Index Ranking (1996 – 2003) (International Informatization Indes DB, 2004)*

| Country | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Sweden | 4 | 4 | 4 | 3 | 5 | 2 | 3 | 1 |
| Denmark | 5 | 6 | 5 | 4 | 4 | 5 | 4 | 2 |
| USA | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| Switzerland | 8 | 7 | 8 | 8 | 7 | 6 | 1 | 4 |
| Iceland | NA | NA | NA | NA | NA | NA | NA | 5 |
| Canada | 6 | 5 | 6 | 7 | 6 | 7 | 13 | 6 |
| S. Korea | 22 | 22 | 22 | 19 | 14 | 14 | 12 | 7 |
| Netherlands | 9 | 9 | 7 | 5 | 3 | 3 | 6 | 8 |
| Norway | 3 | 2 | 2 | 2 | 2 | 4 | 7 | 9 |
| UK | 13 | 15 | 12 | 12 | 11 | 12 | 14 | 10 |

*Table 12. E-government readiness index: Top 10 countries (UNPAN, UN Global E-government Readiness Report 2004)*

| Rank | Nation | Index |
|---|---|---|
| 1 | United States | 0.9132 |
| 2 | Denmark | 0.9047 |
| 3 | United Kingdom | 0.8852 |
| 4 | Sweden | 0.8741 |
| 5 | South Korea | 0.8575 |
| 6 | Australia | 0.8377 |
| 7 | Canada | 0.8369 |
| 8 | Singapore | 0.8340 |
| 9 | Finland | 0.8239 |
| 10 | Norway | 0.8178 |

*Table 13. Informatization status in South Korea (National Computerization Agency, White Paper, 2004)*

| Classification | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Broadband Internet Subscribers (1k households) | 374 | 4,010 | 7,810 | 10,400 | 11,180 |
| Internet Users (1k) | 10,860 | 19,040 | 24,380 | 26,270 | 29,220 |
| Number of PC's (1k sets) | 11,530 | 18,615 | 22,495 | 23,502 | 26,741 |
| Mobile Phone Subscribers (1k) | 23,443 | 26,816 | 29,046 | 32,342 | 33,592 |
| E-commerce (%) | NA | 4.5 | 9.1 | 12.8 | 16.5 |
| Internet Banking Users (1k) | 1,230 | 4,090 | 11,310 | 17,710 | 22,754 |

The informatization budget of the government increased an average of 23% per annum from 1998 to 2002. It was 715 billion won in 1998 and increased to 1.6 trillion won in 2002, which accounted for 1% to 1.5% of the total budget (see Table 9). The public and private sector's heavy investment in the IT industry reached an average of 5.3% of GDP in the 1990s, which resulted in an improvement of national informatization index and ranking continuously. Regarding ITU International Informatization Index DB, South Korea raised its national informatization index from 52 in 1996 to 89 in 2003. Accordingly, its ranking was upgraded from 22$^{nd}$ to 7$^{th}$ in the same period (see Tables 10 and 11). In addition, UN Global E-Government Readiness Report (2004) ranked South Korea as the fifth in the world, which is even more advanced than in the ITU International Informatization Index DB (see Table 12).

## FUTURE TRENDS

The South Korean government will enhance the nationwide information infrastructure continuously. For it, the government has launched mid- to long-term vision and strategies such as Cyber Korea 21, e-Korea Vision 2006, and Broadband IT Korea VISION 2007. Moreover, the government is ready to cooperate with the private sector in order to strengthen the partnership between the two actors.

The early adaptation of broadband Internet networks has created various Internet business opportunities and an explosive demand for communication and entertainment. On the basis of the broadband Internet networks, South Korean society becomes a dynamic and innovative civilization due to its open and network nature of ICT that contributes to generating the country's next economic leap and to improving the quality of living for its citizens.

With drastic changes of global economic environment, the broadening of communication networks and the convergence of wired and wireless networks will be strengthened. Therefore, the government unveiled its Broadband IT Korea Vision 2007 to reflect changes in the information environment since e-Korea Vision 2006. The Broadband IT Korea Vision 2007 focuses on the following three directions: from quantitative expansion to qualitative improvement, from government-led industrial growth to industrial-led, and from a catch-up strategy to a leadership strategy (National Computerization Agency, 2005).

## CONCLUSION

It may be widely accepted that the 21$^{st}$ century is regarded as an information age. All advanced nations began to invest in building knowledge infrastructure, which is a basic precondition in order to establish e-government. This notion was intensified by the initiative of the information superhighway in the US in the beginning of the 1990s. Since then, many nations invested large-scale in IT sectors in order to preempt their leading position in the world. As a result, it seems to be that instituting an e-government is no longer an option but rather a mandate in the globalizing economic system.

South Korea is not an exceptional case. The government prepared to build an e-government since the mid-1980s, although its starting point was based on gathering national basic information. Since the 1990s, the government has followed the global trend to build information infrastructure.

With the e-government initiatives, the IT industry became the largest export industry, which accounted for 29.5% of the total exports in 2003. This also has contributed to creating the national economic growth. In fact, e-government initiatives have played roles in building the knowledge infrastructure as well as expanding the IT industry as a key strategic industry.

In line with the strong will of the government to build e-government as well as the heavy investment of the private sector in the IT industry, South Korea is positioned in the leading group, particularly in the areas of broadband Internet subscriber, Internet user, and cable TV subscriber. These areas are key factors to build the knowledge infrastructure. In the industrial perspective, this trend has enabled the generation of world-class IT products such as LCD monitors, semiconductors, and mobile telephones.

Regarding e-government, there are various opinions. In fact, most governments have experienced problems and difficulties when they implement large IT projects for building knowledge infrastructure. Moreover, governments are not alone in failing. Private corporations, which participated in the large IT projects, also faced similar barriers, even in advanced nations. Despite such political and economic risks, most

OECD member nations have expressed their ambitions to implement the e-government initiative. In order to minimize the risks, all governments have to learn to manage how to implement their initiatives based on their economic capacity as well as their technological capability (OECD, 2001b).

In the South Korean case, like other advanced nations, e-government initiatives have been a great ambition. The government provides three visions: the best administrative services to individuals; the right support for businesses; and the improvement of productivity, transparency, and democracy. Among these, administrative services have been improved in terms of time and cost, while productivity and transparency on the government side seem to have improved only slightly due to the low ranking of transparency index.

In summary, it is safe to say that e-government initiatives in South Korea have contributed to building knowledge infrastructure firmly as well as rapidly expanding IT industries. At the same time, however, there are still tasks to face in order to improve the productivity and transparency of the government.

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## KEY TERMS

**G2B (Government to Business):** Services provided by governments to businesses based on ICTs.

**G4C (Government for Citizen):** Services provided by governments for citizens based on ICTs.

**Information Superhighway:** A highway in which information can be transferred with high speed through a broadband Internet system.

**Knowledge-Based Information Society:** A society in which ICTs are used for sharing and transferring knowledge and information.

**Knowledge Economy:** An economy in which more than 40% of employees are employed in high-technology manufacturing and knowledge-intensive services.

**Knowledge Infrastructure:** An infrastructure that enables the transfer and creation of knowledge.

**One-Stop Service System:** A system that provides comprehensive services in one place.

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## INTRODUCTION

Chinese e-government was launched at the beginning of 1990s. It is necessary to develop e-government not only for the appeal of information technology and the government's reform in the social and economic transition, but also for the demand of joining WTO (Wu & Zhang, 2003). Due to the developments in social organization, economy, and information infrastructure in China, e-government still remains at the initial stage (China E-government Research Center, 2002). Shanghai, as the largest and most flourishing city in China, is superior to other areas of China in hardware (information infrastructure, etc.) and software (e.g., "citizens' concept") (Qiao, 2004). Shanghai's experiences may be the example for other provinces and cities, for (1) the e-government of Shanghai was named as a model by National Informatization Commission (NIC) in 2001; and (2) Shanghai leads the development of e-government in China. For example, Shanghai is the first local government to construct governmental Web portal, to provide online services and to make legal rules about open public information. This article describes the development of e-government in Shanghai, analyzes its predicament, and probes into its future trends.

## BACKGROUND

### The Special Goal of Chinese E-Government

Governments around the world are embracing electronic government. From industrialized countries to developing ones, national and local governments are moving online (Improvement & Development Agency, 2002; Taylor, 2002). China is one of the countries following this trend even though its goals might not be exactly the same as Western countries who are promoting E-government as a way of realizing e-democracy (Bonham, Seifert, & Thorson, 2001; Phil Noble & Associates, Inc., 2001). Liu Yadong made it clear that Shanghai is focusing on IT as it leads to More Effective and Efficient Public Services (Liu, 2004). Therefore, e-government is broadly seen as the use of information and communication to promote more efficient and effective government.

### How E-Government is Generally Defined in China

According to citation review, the most popular definition of e-government in China is the following given by the World Bank:

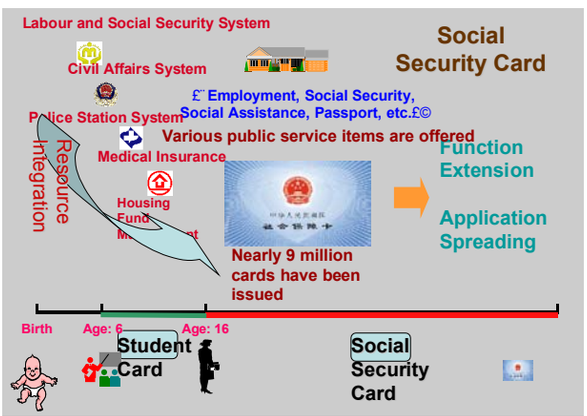
*E-government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.* (The World Bank Group, 2003)

### Research Review of the E-Government of Shanghai

Despite this rapid growth of e-government in China, no studies were found that explored the content of either national or provincial Chinese e-government systematically (Xiang, 2004). Besides some speeches and official documents, research about the e-government of Shanghai is practically non-existent.

Our discussion is based on a study of e-government projects in which three primary categories were identified: e-governance, e-service, and e-knowledge. E-governance refers to linking citizens, stakeholders, and elected representatives to participate in governance of communities.

*Figure 1. Illustration of labor and social security system of Shanghai*




E-service involves securing and providing government services by electronic means. E-knowledge means using communication technologies to gain knowledge (Improvement & Development Agency, 2002). This text will analyze the e-government of Shanghai regarding these three respects as the frame combining with the reality of Shanghai.

## THE DEVELOPMENT OF E-GOVERNMENT IN SHANGHAI

In order to build the metropolis as the international economic center, the financial center, trading center and shipping center, Shanghai should play the role of the bellwether in the urban informatization. It will be the new theme of Shanghai development and the new motive power of social development as well. Although the building of Shanghai e-government is in its infancy, some achievements can be demonstrated, such as:

- Shanghai has accomplished the connection between official portal Web site (www.shanghai.gov.cn) and 47 municipal bureaus, 19 county's or district's governments, and 140 Web sites such as the People's Congress, CPPCC, public groups and so on (Gu, 2003).
- By the end of 2003, there were more than 1.421 million times that people visited the Web sites (Shanghai Municipal Informatization Commission, 2004).
- The design of government service base has changed according to the citizens' demands rather than administrative section's function. For example, Social Security Card (SSC) enables citizens to enjoy convenient public services (Shanghai Labor and Social Security Bureau, 2003). SSC, an IC card, is a key to operate more than 20 public services for citizens, such as medical care, unemployment benefit, and others. An information system, base of SSC, integrates a number of social services with public information.
- The online service way of dealing government affairs has been changed from only one section to joint sections (Shanghai Municipal Informatization Commission, 2004).
- The procedures of form downloaded and online registration have changed from one-way transmission into bilateral interaction by multi-alternative Internet (He, 2004).

## THE CURRENT SITUATION OF SHANGHAI E-GOVERNMENT

### Strengths of E-Government in Shanghai

#### Fairly Good Infrastructure

In Shanghai, several indexes (such as quantities of regular telephones, cellular telephones, libraries, and GDP per capita, etc.) are much better than those of other cities in China. Table 1 lists some indexes between Shanghai and Beijing. So, Shanghai's relatively perfect infrastructure has laid good foundations for the building of Shanghai informatization. It is one of the prerequisites for Shanghai ranking in a leading position among domestic cities.

*Table 1. Some indicators: Shanghai vs. Beijing*

| Index | Shanghai | Beijing |
|---|---|---|
| GDP (billion yuan) | 625.081 | 366.310 |
| per GDP ( yuan/person) | 46,718 | 32,061 |
| Population (ten thousand) | 1,711 | 1,456 |
| The length of long-distance optical fiber cable line (km) | 4,215 | 3,984 |
| The length of long-distance microwave line (km) | 313 | 266 |
| The capacity of mobile telephone switching exchange (ten thousand doors) | 1,547.0 | 1,351.0 |
| The capacity of long-distance automatic switching exchange (road-head) | 235,000 | 219,155 |

*Exchange rates (approx. in 2006): 1 CNY (Chinese Yuan) = 0.12 USD = 0.10 EUR*

### Relatively High Integrated Level and Approached Informatinized Indexes among Districts or Country in Shanghai

Obviously, it is easier to perfect the information infrastructure in a smaller area (a city) than in a larger area (a province). In Shanghai, there are about 19 districts and countries. Due to close-set geographical positions, they influence and infiltrate each other and their economic indexes are approached. In any case, possessing the powerful integrated economical and social act strength are the key factors that informatization level among all the districts or country in Shanghai rank high.

### Twin Wings Fly Together: Informatization for Both Citizens and Government

Informatization for both citizens and government are just like twin wings of Shanghai informatization. The goal of Shanghai e-government is to permeate the informatization into the traditional industries and operating mechanism. It is just like to "moist everything on earth gently and silently." Government at all levels armed by informatization, will fresh stronger vigor and accomplish high-efficiency management and service of government affairs.

## Weakness of Shanghai E-Government

### The Obstacles of Traditional Government's Administrative System and Mechanism

Most of the administration system and mechanism of Shanghai municipality were established and taken shape in the period of planned economy years. Although the situation has changed with the development of market economy, some profound problems are still existent. For example: some administration departments are unsuitable, their functions are crossed and overlapped, administrative procedures are fewer rational and handling public affairs are lack of transparency and so on. All these problems would become obstacles of government informatization.

### Lack of Integration of Information Systems within Each Government Administrative Section

To make good integrative programs and formulate unified standards are general experiences of developing government in foreign countries. Although Shanghai has made some practical regulations, they are not perfect. Were it not be improved, the coordination between governments and administrative sections would be very difficult and extravagant.

The problem how to renovate present resources effectively according to the unified programs and standards has been the key link of developing government informatization and e-government.

### The Basic Research of E-Government is Weak and without Profound Theoretical Foundation

In the building of e-government, people think high of "construction" and "technology" but neglect "research" and "management."

### The Talents Majoring in Government Affairs are Scarce

Although there are nearly 90,000 public servants in Shanghai, those who are familiar with the complete process of public affairs are few, and those who can assist building e-government are less.

### Challenges to Government Functionaries

Developing e-government means that the administrative model should be changed from traditional into informational and networked system. It requires higher quality for the entirety of government functionaries. At present, Shanghai government functionaries are lacking in informative knowledge and unacquainted in informative tools. Though government functionaries have been offered courses in basic computer skills, the requirements of the informatization of government are still to be met. Moreover, it puts forward higher requirement for enforcing traditional administrative power and playing supervision in market economy system according to the laws and regulations. Some government functionaries would meet threat for their ideology being out of time.

## FUTURE TRENDS OF SHANGHAI E-GOVERNMENT

According to the development of e-government and the fact of Shanghai, specially outlined in "the 11th Five-Year Plan" of Shanghai, the future trend of Shanghai e-government as follows:

1. Build a safe and reliable e-government platform with perfect function, unified standard for all government departments, districts, and counties in Shanghai. Their government affairs can be dealt and information can be exchanged on the interconnected network. Therefore, the working efficiency will be high and the administrative cost can be reduced.
2. Digitization, automation, and informatization are accomplished for files, official business, and administration of government organs at all levels in Shanghai. All the public files, meetings, supervisions, and information inquiries can be handled on network. More than 80% of public affairs can be dealt with on network.
3. Supply centralized public service by "one stop," "one procedure," and "one window." Release online news of government affairs promptly. Citizens cane obtain government's information and service conveniently by various kinds of terminal station such as Web site, telephone, IC card, and so on and supervise government affairs.
4. Make obvious progress on building of basic and strategic information resources such as data of population, legal persons, geographical features, and macro-economy conditions.
5. Build up the unified platform of e-government digital certificates and backup system for calamity. The information security system should be set up in conformity with informatization development.
6. Cards at all levels raise their consciousness of informatization and the ability to use information technology. Government functionaries should take part in the training of informatization and over 90% of them should pass its examination.

## CONCLUSION

According to following three aspects, Shanghai is reinforced to respond to the increasing demand for public services through e-government: (1) To speed up the transformation of government responsibilities; (2) To improve e-government according to the requirement of transforming government responsibilities—put more public service items online to make government services more accessible and efficient; (3) Shanghai citizens are quite familiar with IT and the concept of informatization–almost 5 million Internet users, 1.3 million family broadband subscribers, and 60% of household PC penetration rate, which make it possible to expand public services in the framework of e-government. E-government in Shanghai has many progresses in official portal Web site, citizen-oriented function, interactive online service and others. Although Shanghai has many advantages in developing e-government, there is much weakness also, for example, government's administrative system, or mechanism, lacking integrated information system, basic research, and talents being scarce. In the next years, Shanghai will elevate citizens' familiarity to the concept of informatization and the ability to use information technology, and build effective mechanism to invite citizens' comments on e-government.

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## KEY TERMS

**Administrative System in Shanghai:** Shanghai administering 18 districts and one county. In the urban area, the administrative system in Shanghai is "two levels governments, three levels management, four levels networks." The "two levels governments" refer to the municipal government and district government. The "three levels management" refers to except municipal government and district government, the sub-district office (the agency of the district government) bears government's public management function too. The "four levels networks" means besides above-mentioned three levels management organization, the autonomy organization of the basic unit (residents committee or villagers' committee) gives play to the role of linking between people and government in the public affairs, thus formed networks of four levels in city management: the municipal government, district government, sub-district office, and autonomy organization at the basic level. In the suburb, the administrative system is "three levels governments, three levels management, four levels networks," only because the town government is a legal government's level.

**E-Government:** As to the traditional government, the core of e-government is making the existence form of government take place great change, through using modern information technology, network technology, and communication technology among the traditional governments, to form one platform of government combined reality and network virtue together. Therefore, the e-government is an electronic network government.

**Five-Year-Plan:** The "five-year-plan" is a kind of guiding policy of Chinese Government to national socio-economic development. "It originates from" the first Five-Year Plan which issued and implemented in 1953, and the time span of "the first Five-Year Plan" was from 1953 to 1957. Because of some reasons, there had cut off three years between "the second Five-Year Plan" (1958-1962 ) with "the third Five-Year Plan" (1966-1970 ). Analogizing sequentially, the time span of "the tenth Five-Year Plan" is from 2001 to 2005. The time span of "the 11th Five-Year Plan" which is planning at present is from 2006 to 2010.

**Informationization:** The informationization is a transition course. Pointing that the development of modern information technology (IT) will lead the mankind to the information-intensive society relying mainly on information industry from the industrial society relying mainly on traditional industry.

**Integrated Information System:** To the public affairs in one level government or an area, propose an integrated

information system. In order to prevent the government department turning into information detached islands when realizing the informationization.

**Interactive Service:** Through the e-government, the citizen, enterprise can carry on the communication with the government in the network, and the government can answer the citizen, enterprise pass the electronic way in conformity with the request too. That is to say, the government and citizen or enterprise can finish being bilateral interaction in the network, and even can finish the whole course of a certain public affairs.

**Official Portal Web Site:** A trans-departmental and comprehensive public affairs application system. On the informationization construction foundation of every government department, the citizen, enterprise and government's staff member can all insert every relevant government department's affairs application, organization content and information conveniently fast through the official portal Web site, obtain the individualized service, enable the suitable person to obtain the appropriate service in proper time.

# E-Government in the Information Society

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## INTRODUCTION

The information society (IS), which nowadays is the emerging form of the organization of advanced societies (see e.g., Castells, 1996; May, 2002; Zacher, 2000a, 2000b), is governed more and more by the use of electronic devices and systems. That is why the concept of *e-government* was introduced and practically implemented. (For a historical perspective, see the article on Historical Perspective of E-Government).

## BACKGROUND: BASIC FUNCTIONS AND VARIOUS MEANINGS OF E-GOVERNMENT

Apart from the technical side (e.g., infrastructure, equipment, programs) *e-government* can be defined as a *set of practices or activities* of various kinds—ranging from political decisions, national legislation, international actions, and so forth, to public services for citizens on a local level—which use ICTs. Such practices can be not only high-level decisions and general regulations, but also information and services available for individuals, groups, communities connected with possible public support, job opportunities, on line payments, various advice and so on.

Thus, e-government can be defined as the production and delivery of services (including information) within government and between government and the public—using ICTs (see e.g., Fountain, 2004). In the broader definition, not only practices enhancing access to and delivery of services are mentioned but also more general aim—to improve relations between government institutions and citizens (Heichlinger 2004).

Electronic or in other words info-communication technology (nowadays mostly digital) is just a powerful new instrument of politics, decision making, public administration, and governance. So it can be evaluated from the point of view of its applicability, appropriateness, effectiveness and efficiency—all not only in a technical but also a political sense. On the other side citizens and facilitations of their life and activities (e.g., in business) can be the reference point. Under democratic political regimes, the latter is underlined.

Ideally, e-government should mean less management and more stewardship of government (all levels and agencies) and more citizens' participation. Therefore, e-government can be not only more efficient public services but also a *part of democratic process*. Alternatively e- government can be substantially commercialized (citizens become then customers or clients solely) and can be treated as a "technical tool." Of course, in practice some mixed solutions are possible and possibly most realistic (in any market economy).

E-government as it is now in the advanced countries (e.g., in the EU—see e.g., e-Forum and e-Europe Web sites) appears to be a fundamental issue especially on a local level. On this level, authorities and administrations have frequent and mostly direct contact with citizens and other stakeholders (e.g., companies, NGOs, foreign firms).

Applications of electronic instruments (or in other words ICTs) in politics, administration and management proved to be extremely useful and efficient at least in certain fields like

- Identification, recognition, and documentation of needs of various social groups which are consumers of public services
- Improvement of efficiency and also transparency and trust (making public all procedures and other information)
- Information policy (i.e., publications of various reports, official documents, projects and plans to be debated) and citizens' participation (by use of interactive media)

E-government as a result of the application of ICTs in public administration activities and having multifaceted impacts will enhance *e-governance* and *e-democracy*. Moreover, its transforming role makes it an important characteristic and a part of IS.

From the beginning e-government oriented predominantly to the needs of bureaucracy, and the information of its work, procedures, and so forth had to be more effective, relevant, and easier. Then the massive access to the Internet, online information, and better communication between public administration and citizens made a difference. The participation of citizens, clients, and various stakeholders in shaping and providing public ser-

vices became politically possible and technically feasible. Moreover, participation was often declared as an important social value under democracy. Therefore, the management of public matters was somewhat transformed—*via* e-government into e-governance.

Moreover, due to the integration of bureaucratic work and its networking, the public administration institutions served their clients much better (i.e., faster) without multiplied visits in these institutions, without multiple data presentations, without corruptive situations.

There were some necessary stages of e-government evolution (or rather its building). The initial step was always a simple *Web site*, which served as the first contact and source of information about the institution, its services, procedures, and so forth. The next step was to make the relation between the institution and its clients interactive. The interactive Web site is possible only if some technological, organizational, and legal conditions are fulfilled (e.g., some necessary connections between Intranet system of an institution with Internet as an external system, validity of electronic signature). Further stages of the evolution are the following:

- Multifunctional fully interactive portals
- Personalized portals providing integrated services
- One official portal for all public services providing an integrated packages of services

The sequence of evolutionary stages of e-government has not only a technological dimension. The consecutive changes shift the communication between citizens and public administration to *virtual space* (time and physical space are not important any more). Further change makes inner structures and competence pattern of public institutions meaningless as well. Moreover, these processes are accompanied by steadily growing depersonification.

## MAIN ISSUES OF E-GOVERNMENT

E-government is still *in statu nascendi,* in its developing stage, accumulating experience, improving functioning. Moreover, in some countries it is already well grounded in the mentality, organization of the public sphere, in politics. However, in some it is still a new concept not practically explored yet. This is the problem of the transition economies especially those joining EU. Of course, there are many challenges faced by public administration and public organizations in all countries trying to use ICTs to serve societies better.

There are at least four groups of challenges:

- Legal issues
- Accessibility issues
- Economic issues
- Social issues

The *legal issues* in e-government concern such questions like privacy, authentication, taxation, various e-submissions, also e-voting and e-government presence in the courts, and so forth. It is evident that the adoption of e-government (or in other words—e-government techniques) has to affect legal systems and legal practices.

The *accessibility problem* of e-government applications in countries advanced and rich, with good technical infrastructure, a high level of computer literacy is limited mostly to groups of citizens with some disabilities (physical, cognitive, hearing, and vision impairments). Therefore, these applications ought to be user-friendly and inclusive. A more difficult issue to solve is—in the context of e-government (or e-governance in broader sense)—what to do with an often quite large social margin or socially excluded people (e.g., former prisoners) permanently unemployed, homeless, very poor, illegal migrants, and so on. Of course, the solution cannot be in this case only techno-organizational.

Growing e-government throughout Europe and the world is costly, which makes it an *economic issue*. Until recently, the fascination of ICTs use in public administration overweighed the question of return on investment. E-government as a certain benefit for citizens' use of resources (always limited) should prove its economic validity and effectiveness.

*Social issues* were already previously discussed. What can be added here is that the accessibility issue also has financial and social dimensions. Needless to add that social adoption and use of e-government applications require learning, computer literacy, and so forth. Moreover, it is expected that broadly understood e-government (or rather e-governance) facilitates inclusion, participation, democracy. This also has an important political meaning.

E-government is not only about faster and better provision of public service. It can give groups of citizens and of individuals not only some satisfaction but also citizen or community identity, some possibilities to act and to interact with others, to enable sharing of experience. Groups and individuals are not separated and closed any more since the Internet gives them an opportunity to function in the "connected intelligence" system (to use the de Kerckhove term—Kerckhove, 1997). This somewhat external input will certainly contribute to local, regional, and national e-government and could be seeds for world e-governance.

## E-GOVERNANCE: MORE PROMISES

Needless to add that e-government and e-governance can have very different frameworks for their functioning and performance. In fact, they vary from country to country, from region to region, from continent to continent. All possible differences and specificities—in political and legal systems, historical traditions, level of citizens' social and political activism, knowledge of their rights and opportunities, skills of using ICTs—have influence. Moreover technical infrastructure and its—also financial—accessibility is what counts as well. Often the poor, unemployed, the disabled, the elderly can be excluded. That is why e-government should be oriented toward such goals as *social inclusion* and *citizen participation* on a significant scale. However such goals are political but ICTs can help greatly. In fact, they create a historical chance to make democracy inclusive and participatory.

The important feature of e-government is a *learning process* on all sides—authorities and public, public administrations, public sector organizations, and various stakeholders. In this process, new knowledge and new digital technologies have to be absorbed and deliberately applied. This in turn requires new skills, education, the proactive attitude of citizens (being also clients, customers, stakeholders, lobbyists, etc.). Therefore, e-government does not only mean improvement of efficiency and higher speed of delivering services to citizens. It generates a new *social space*. It is a part of the greater change, namely the change of the relation between government (power) and citizens. Historically the partners of these relations were not equal. The new role and the growing significance of information are making this situation more equal and advantageous from the citizens' side. Such things like mass media, info systems, or Internet are in fact commonly available (at least in the advanced countries). Thanks to radio, TV, computers and nets, even the new generations of mobile phones, widespread information becomes then an important *form of control* of people over political and administrative power, also to some extent over business. ICTs enable the sharing of knowledge on the political process and on administrative procedures with citizens. More and faster information, more transparency in decision making, and above all—more interactive procedures means simply more democracy in governance, more space for civil society (see e.g., Ester & Vinken, 2003; Keskinen, 1999; Okot-Uma, 2002; Van de Donk 2000). It helps with the legitimization of power and enhances the participation of people. So e-society (or IS) can be—normatively—characterized by *e-governance*, *e-government*, and *e-democracy*.

Needless to add however that the present practice is quite far from the desirable ideal (the distance from it differs greatly and depends on many factors and circumstances). The principles of *good governance*—defined by the European Commission (White Paper on European Governance published in July 2001) are *openness, participation, reliability, efficiency, consistence*. To achieve this, an appropriate information policy should be implemented. Information politics is the important issue in any IS (e.g., Dutton, 1999).

## TOWARD INTEGRATED GOVERNANCE

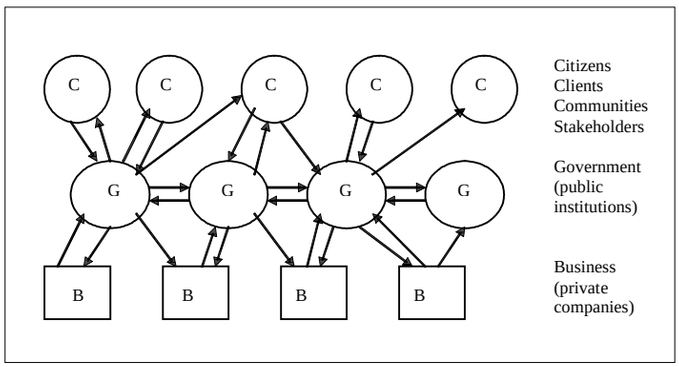
E-governance as being integrated is often called (see Heeks, 2001a) *integrated governance* (i-governance). This name reflects the integration of technology, information, procedures, and people. It is assumed that these are three components or rather subsystems of i-governance: e-government, e-democracy, e-business. E-government includes mostly structures, applications and procedures (this is technical and organizational orientation) of provision of public services. E-democracy however is rather politically oriented since it is connected not only with electronic communication and access to process, public services availability and possibilities of choice (see e.g., Browning, 1996). Citizens empower political actors. They can interact with political power and public administration and participate in decision-making processes (see e.g., Hague & Loader, 1999). This is important since public services provided to citizens often depend on policies and interpretation of legal regulations.

In turn, e-business is—but not exclusively—commercially oriented (e.g., provision of services to clients, commercial partnership, electronic transactions). Relations and information flows concerning the exchange of information and services provision are multiple here. They may be categorized as follows:

- Government to government (or public institution to public institution)
- Government to citizen (or public institution to citizen, consumers, other stakeholders)
- Citizens to government (or citizens, clients, stakeholders to public institutions)
- Government to business (or public institutions to private companies)
- Business to government (or private companies to public institutions)

This is presented schematically on the picture in Figure 1.

*Figure 1. The net (simplified) of relations and exchanges of citizens, government and business*




Therefore, e-governance creates technical, organizational, and network structure in an information society. Equal opportunities and empowerment of social actors makes it political dimension.

General evaluation of e-governance is positive since it makes possible to serve society better, to enable the rationalization of work, employment and management in public administration and public organizations; also it can be cost-effective; and above all it promotes democracy, participation, human activism. It is needless to prove that the successful implementation of e-governance principles and procedures depends on many—very differentiated nationally, regionally, locally—factors and circumstances, to name a few: e-literacy and e-readiness in society and public institutions, e-government strategies and policies, e-infrastructure, legal framework, and so forth. For Heeks, the strategic challenge is just e-readiness for e-governance (Heeks, 2001a).

## FUTURE TRENDS

### E-Future: Uncertain Predictions

It is worth noting that e-governance understood as e-authority or e-power in general (power structure and institutions, politics, power play, etc.) can lead to better legitimization of power, to more democracy, transparency, trust, participation, efficiency. However, it may lead also to more elitist, technocratic governance, to bureaucracy and to manipulation. ICTs do not exclude authoritarian rules, corruption, oppression, and terror. The trajectory of evolution of e-societies (see my article in this book on e-transformations of societies) are not really deterministic. In spite of the tendency to democratize the world's societies, the future is not certain whatsoever. There are counter—tendencies as well (e.g., due to the "clash of civilizations,") international terrorism, armed conflicts, social and political unrests, and turbulences in many places, also due to the growing criticism and opposition to the present type of globalization which is giving more to the rich and stimulating the digital divide (Chen, & Wellman, 2004).

On the other side in the longer time horizon e-transformations may disintegrate societies as organized presently. Some new forms may emerge and traditionally understood governance, politics and control will be modified somehow. Less and less of the state and its power structures, institutions and functions, more and more individualization (in the Net) and social atomization, changes of identity, closer, and closer relations between man and machines (such co-evolution plus growing artificialization of man will direct humanity towards a posthuman era—in the opinion of many futurists). It is in fact impossible to predict a distant future, because the current trends may change, people and their organizational forms may transform in a surprising way, moreover the divided and turbulent world may collapse. So the present visions of the e-future where semi-artificial humans, networked, living mostly in the Net, in virtual reality, with their fuzzy and multiple identity may never come true, but if they will—probably such notions like e-governance, e-democracy, e-government will not be applicable.

## CONCLUSION

### Further Research Questions

There are some timely research questions concerning above problematique. Their keywords can be arbitralily listed as follows:

- **Civilization or Age and Development Issues:** There are labels as new civilization (Toffler A. & H., 1994), information civilization (Hague & Loader, 1999), age (Heeks, 2001), age of network technology (Barney, 2000), digital age (Dutton, 1999).
- **State**, **Society**, **Citizens**, **Communities**, **Individualism:** There are labels like virtual state (Everard, 2000), network society (Van Dijk, 1999), digital citizen (Katz, 1997), virtual community (Rheingold, 1993, Wellman & Haythornthwaite, 2003), networked individualism (Wellman, 2001).
- **Democracy:** Some important terms were introduced and debated: anticipatory democracy (see Bezold, 1978), electronic democracy (Browning, 1996), teledemocracy (Becker & Slaton, 2000), democracy.com (Kamarck & Nye, 1999), digital democracy (Hague & Loader, 1999, Wilhelm, 2002), infocracy (Van de Donk, 2000).
- **Governance:** In this are some new ideas and postulates were formulated (e.g., capacity to govern) (Dror, 1999) was re-evaluated, future governance was extensively debated (e.g., Governance, 2001), governance in a networked world (Kamarck & Nye, 1999), electronic governance (Okot-Uma, 2002), e-government (Heichlinger, 2004), e-governance for development (Heeks, 2001a, 2001b).

The authors previously mentioned are just exemplary. Also, the list of the main problems can be supplemented (e.g., with technology area in which computer-mediated communication is an important issue—see e.g., Fuller, 1996, Herring, 1996, Hiltz & Turoff, 1978, Jones, 1998). Anyway, the question is how to integrate the above problem areas, approaches and methods used, how to make them mutually compatible. The answer lies in multi, inter- and—above all—transdisciplinary approaches and methods. Moreover the problematique discussed is rather new and or *in statu nascendi* so almost constant re-definitions, re-interpretation and re-evaluations seem to be needed in the future.

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## KEY TERMS

**E-Democracy:** Refers to the democratic political system in which computers and electronic nets are used to implement its basic functions like information, communication, participation, and decision making.

**E-Governance:** Refers to public governance and is often identified with e-government but in a broader sense including politics (e-politics) and e-democracy.

**E-Government:** Various practices using ICTs applications to provide services by public administration to the society and to interact with various stakeholders.

**Information Society:** A society, which predominantly deals with production and applications of information in all fields of economy and social life. In the vast literature of the subject there are synonyms or closely related terms used: *information-rich society*, *informational society*, *cyber-society*, *e-society*, *network* (or *networked*) *society*, *virtual society*. They relate also to such term as *community*.

**Integrated Governance:** Integrates ICTs, information procedures and citizens in the process of achieving public goals; consists of three subsystems: e-democracy, e-government, and e-business.

**Teledemocracy:** Implementing media in the democratic process, mostly for information, opinion polls, referenda (i.e., mass participation of people).

# E-Government in the United Kingdom

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## INTRODUCTION

Like many of its western counterparts, the United Kingdom (UK) government has a long history of using IT in the administration and delivery of public services. Indeed, as early as 1959 mainframe computers were introduced in order to automate some routine aspects of public administration (Margetts & Willcocks, 1992, p. 329). However, it was not until the late 1970s and early 1980s—as the UK rose to the forefront of the emerging microcomputer industry—that IT featured in policy discourse in anything other than an extremely minor fashion. Even then—despite the appointment of Kenneth Baker as the government's first Information Technology Minister in 1981—the issue did not feature prominently and there was nothing approaching the equivalence of the neighbouring French government's review of the long-term social and economic policy implications of *L'Informatisation d'Societe* commissioned in 1976 by President Valéry Giscard d'Estaing (Nora & Minc, 1980). In fact, one former government minister claimed in his diaries that Baker's appointment to the government had more to do with finding a minor role for a politician piqued at his omission from the Cabinet than with Prime Minister Margaret Thatcher's belief in the importance of IT related issues (Lawson, 1992).

However, the agenda began to gather some pace following Thatcher's departure in 1990. Under the helm of Prime Minister John Major, the Conservatives introduced a number of important policies—including a series of industrially focused information society initiatives aimed at boosting the use of ICTs by business. In addition, prompted perhaps by the popular emergence of the Internet, other branches of government began to show a greatly increased interest in the issue. For instance, a Parliamentary committee—the House of Lords Science and Technology Committee (1996)—produced a major report on the implications of the information society for government. In addition, the publication of a major study on the same issue by the European Union (1994) added weight to the emerging agenda. Shortly before losing power in 1997, the Major government produced what was arguably the UK government's first systematic consideration of the implications of ICTs for government when it published an exploratory Green Paper titled *Government.Direct* (CITU, 1996). Though it came too late in the life of the government to advance its ideas any further than the discussion stage, it at least served to heighten the prominence of the agenda (Hudson, 2002).

## BACKGROUND

While the publication of *Government.Direct* was a landmark in the UK's e-government debate, it is fair to say that Tony Blair's incoming New Labour government would have given ICT related issues more prominence in any event. Indeed, while leader of the opposition, Blair famously announced to his party's annual conference that he had struck a deal with British Telecom to connect all of the UK's schools, hospitals, and libraries to the Internet. The announcement performed the dual function of showing that New Labour was both ready to govern and keen to exploit the potential of emerging Internet technologies.

However, Blair's government was in office for more than a year before they published any coherent plans for greater use of ICTs by government—in a broad discussion paper titled *Our Information Age: The Government's Vision* (Cabinet Office, 1998)—and almost two before more concrete policy objectives were published as part of the *Modernising Government* White Paper (Cabinet Office, 1999). Though detail was still thin on the ground, the publication committed the government to making 25% of its services available electronically by 2002 and 100% by 2008. A detailed plan of action was outlined the following year in *e-Government: A Strategic Framework for Government Services in the Information Age*, along with a new commitment to have all services available electronically by 2005 rather than 2008 (Cabinet Office, 2000). These major policy papers were supplemented with the publication of a series of complementary frameworks, guidelines, and regulations (e.g., CITU, 1999, 2000a, b). On top of this, important institutional changes were introduced, most notably the creation of an e-minister, an e-envoy (with his own well staffed office), and a series of departmental "information age government champions" responsible for pushing change forward. Finally, a number of other arms of government were charged with the task of bolstering government thinking in this area, most notably the Cabinet Office's Performance Innovation

*Table 1. Blair's key Information Age government targets*

- UK: best place in the world for e-commerce by end of 2002
- 100% of public services available electronically by end of 2005
- Universal Internet access by end of 2005
- Broadband available to every home by the end of 2008
- High usage of e-government services

Unit who published a weighty document—*e.gov. Electronic Government Services for the 21st Century* (PIU, 2000)—outlining the government's long-term vision (see Hudson, 2002).

Crucially, this agenda was about more than placing basic information about services online. Instead, the government wanted to "bring about a fundamental change in the way we use IT … [to] modernise the business of government itself" (Cabinet Office, 1999, p. 45). They suggested new technology had the power to join-up services that were presently delivered in a fragmented fashion by multiple government agencies through a centralized Web-based portal that would direct citizens to the full range of services relevant to their specific "life-episodes" (p. 47). More radically still, they suggested that as ICTs are likely to engineer a greater front-office/back-office split, there was no reason why private and voluntary sector organizations should not play a greater role in delivering public services—both in terms of back-office processing functions and client-facing front-end tasks (Hudson, 2002; PIU, 2000). Indeed, they envisaged a scenario in which there would be competition and choice for the citizen—between, for instance, the state managed portal for all citizens and more specialized private or voluntary sector maintained portals aimed at particular client groups (CITU, 1999). As the Performance and Innovation Unit (2000) put it at the time: "The vision for electronic delivery of government services is to move to multi-channel, mixed public and private delivery of citizen-focused services" (p. 20).

Alongside these plans for e-government, New Labour also committed themselves to a number of complimentary policy objectives at this time. Chief amongst these were the intentions to make the UK the best place in the world for e-commerce by 2002 and to deliver universal access to the Internet by 2005. The latter objective was, perhaps, less ambitious than it might sound, defined as access to the Internet via a neighbourhood Internet facility rather than in the home. However, it also included a commitment to making training available for those who needed it. Key in terms of meeting these access targets was the development of some 6,000 community based "UK Online" centres. As these programmes came to fruition in 2004, an important additional target was announced by Tony Blair: to make broadband available to every home by 2008. Around the same time, a new e-government target was also established: to ensure high use of electronic public services. Table 1 summarises the key targets.

## PROGRESS AND IMPACTS

As the 2005 target approached, the government maintained they were broadly on track to meet their e-enablement target: 75% of services were available electronically by the end of 2004 and they estimated some 96% would be by the end of 2005 (Cabinet Office, 2005a, 2005c). In global terms, the UK was performing well in many of the rankings of e-government performance at this time too. For instance, the UN placed the UK fourth in the world in terms of e-government readiness (UN, 2005) while a report published by the European Commission (2005) rated the UK as third best in the EU in terms of the sophistication of its e-government services. (See Table 2 for some of the key services.)

However, despite these successes, there are some notable weaknesses in the programme of reform to date. Chief amongst these is perhaps the very low usage of e-services: though the UK ranks highly within the EU for the quality of its services, it finishes bottom of the EU league table in terms of e-government usage by businesses and towards the bottom for usage by citizens (Eurostat, 2005). While there have been three (increasingly sophisticated) incarnations of the central government Web portal during the Blair era—open.gov.uk, UKOnline and, most recently, Directgov—it is fair to say that the visibility of these has remained relatively low given the hype surrounding the e-government agenda at its launch. Indeed, Tony Blair himself recently admitted whilst being questioned in Parliament that he did not know the URL of his government's flagship portal (House of Commons Liaison Committee, 2005, p. Q90). One might add too that the services available at present fall someway short of the radical vision for the reinvention of government trailed in 1999 and that most operate within existing agency boundaries rather than working across them, not least because individual government departments were given a target of getting 100% of their services online by 2005 but no target for working across departments or agencies. Moreover, government has struggled with the issue of online iden-

*Table 2. Examples of key UK e-government services*

NHS Direct
http://www.nhsdirect.nhs.uk/
A call centre based health advice line established in 1998 and backed by a complimentary Web based service, NHS Direct is one of the major success stories of the e-government agenda—though it is the call centre service, rather than the Web based one, that has had the major impact.

Directgov
http://www.direct.gov.uk/
The UK government's main Web portal. Launched in late 2004, it organises material around major "life episodes". It does not allow citizens to undertake transactions within the portal itself, but instead carries links to services provided by agencies across government.

Income Tax Self-Assessment
http://www.hmrc.gov.uk/
Arguably the first major transactional service to be placed online in the UK, it allows (registered) users to submit income tax assessment forms electronically. Introduced in 2000, the service was plagued by technical problems in its early days—and even suspended due to data security fears in 2002—and this hit take-up which was fewer than 1% of potential users by 2002. However, take-up increased substantially after this and by 2005 had reached 17% (1.63 million people). In part this increased take-up has been achieved through the use of accredited third party software by key intermediaries such as accountants.

Tax Credits Online
http://www.hmrc.gov.uk/
Similar in principle to the Self-Assessment online service (and operated by the same agency) this service allows citizens to check for a potential entitlement to tax credits (income top-ups for the low paid or those with children for instance) and then (for registered users) to lodge an application to claim them.

Transport Direct
http://www.transportdirect.info/
An integrated transport information portal that provides information on a range of different types of travel including road, rail, bus, and on foot. The main feature it offers users is the ability to provide information on routes and different transport options for journeys between different streets, suburbs, cities, and landmarks. Users can establish personalised accounts in order to tailor information to their own needs, and the site carries live information about service alterations and traffic delays.

Driving Skills Agency
http://www.dsa.gov.uk/
One of the first e-services to offer users an individual account, visitors to the site can book (and cancel) driving tests and take mock theory tests at this site.

tity verification and many of the transactional services can only be accessed following submission of a paper based registration form, while many others provide online information and downloadable forms but ask citizens to print off and mail in signed forms in order to complete transactions.

In addition, it is probably fair to say that attempts to foster public trust in e-government services have been undermined by a number of well publicized IT disasters, including: several short term withdrawals of a flagship site allowing citizens to submit their tax returns online following technical errors that threatened the security of users' data (*BBC News*, 2000, 2002); the suspension of a site giving access to the 1901 Census just five days after its launch because its technical infrastructure was unable to meet significantly higher than predicted demand for the service (National Audit Office, 2003); and the closure of the tax credits portal following the discovery of widespread organized theft of identity data and connected fraudulent tax credit claims (*BBC News*, 2005). Worse still, problems with major back office systems have hampered the delivery of key public services for a number of years too (see Public Accounts Committee, 1999). The most notable disaster is arguably that involving the Child Support Agency (CSA), whose Child Support Computer System (CS2) is not only due to be delivered years late and tens of millions of pounds over budget, but has caused a delay of several years in the introduction of a new policy framework for assessing child support

payments and placed considerable stress on both CSA staff and customers in hampering the efficient administration of tens of thousands of cases described as being "stuck" in the system (Work and Pensions Select Committee, 2004, 2005). While the precise causes of this—and similar—disasters is subject to considerable debate, many have suggested the UK government's lack of in-house expertise and its reliance on a small number of large IT contractors are particularly problematic. Indeed, Dunleavy et al. (2004, p. 36) have argued that "government-IT industry relations have become dangerously unbalanced" in the UK.

## FUTURE TRENDS

Despite these challenges, the UK government remains committed to its IT based modernization agenda, though there are signs that the substance of the agenda is shifting a little. Indeed, the Office of the e-Envoy, established to oversee the creation of e-government services, was disbanded at the end of 2004—along with the position of e-Envoy itself—and replaced with a more broadly based e-government unit. Whereas the former was primarily concerned with selling the idea of e-services, the latter is concerned with IT more broadly and its first head described his role as analogous to Chief Information Officer of the government (Arnott, 2004). This may be indicative of a more mature phase of e-government development, with the focus now shifting more firmly towards delivering organizational change rather than making existing services electronically available. A new digital strategy published in early 2005—*Connecting the UK*—reaffirmed the government's desire to tackle the digital divide (Cabinet Office, 2005b, p. 7) and a new IT strategy published at the end of 2005—*Transformational Government: Enabled by Technology*—restated the case for using ICTs to boost the quality and efficiency of services but placed a much firmer emphasis on the need to manage change carefully and to boost the professionalism and leadership of IT expertise within government (Cabinet Office, 2005c).

Ahead of these recent developments, a major cross-cutting review of efficiency conducted in 2004 (the so-called "Gershon Review"—see HM Treasury, 2004) placed a heavy emphasis on greater use of ICTs by government; indeed, it concluded that civil servant numbers could be reduced by some 84,000 in part because ICTs could make administrative processes more efficient. The review also suggested that savings could be made by migrating particular customer segments to electronic channels. The new IT strategy echoes these claims and is much more focused on the efficiency dimension of e-government than its predecessor. Indeed, the future trajectory of reform seems likely to be a more aggressively cost-focused one. A marker of this is that the old *Modernising Government* strategy stated that ICT "developments will not limit choice [or] end face-to-face dealings" (Cabinet Office, 1999, p. 53), while the new *Transformational Government* strategy argues

> *government should steer citizens and businesses to the lowest cost channels consistent with meeting policy objectives and customer acceptability. At an appropriate time, legacy channels should be closed ... unless there are compelling policy reasons that cannot be achieved by other means.* (Cabinet Office, 2005c, p. 11)

## CONCLUSION

As the first phase of Blair's e-government agenda reaches its end, it is clear that much has been achieved in terms of creating a substantial online presence for government but that much remains to be done if the aim is to deliver a significant shift in citizen-state interactions. Moreover, it seems clear too that some of the dotcom boom fuelled optimism that was evident in early policy pronouncements has been replaced by a more hard headed focus on cost savings and delivery. While the UK government has fared well in terms of meeting its main information age government targets and ranks highly in international league tables capturing various dimensions of e-government performance, the overall impact of e-government at the end of 2005 remains relatively modest given the substantial sums of money invested and the revolutionary rhetoric of most policy pronouncements. Whether the second phase of e-government signalled by the new IT strategy will improve on this record remains to be seen.

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## KEY TERMS

**Directgov:** The UK government's citizen portal (www.direct.gov.uk)

**E-Government Unit:** Established in late 2004 as a division of the Cabinet Office and responsible for overseeing the use of IT across government.

**Government.Direct:** Title of the first UK government policy paper explicitly examining the implications of the Web for public services. Published as a Green Paper by John Major's Conservative Government in 1996.

**Office of the E-Envoy:** Established in 1998 as a division of the Cabinet Office to support the E-Envoy in promoting and overseeing the e-government agenda. Abolished in 1998.

**Modernising Government:** A White Paper published by the Blair government in 1999 that laid down the core principles of the first phase of their e-government agenda.

**Transformational Government:** Title of the Blair government's new IT strategy, published in 2005, that lays down the principles the second phase of its e-government agenda.

**UK Online:** A brand name used to package together some of the aspects of the early information age government agenda including the drive to boost Internet usage in the community and the second incarnation of the UK government's central Web portal.

# E-Government in Transition Economies

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## INTRODUCTION

*In December of 2002, the Lithuanian government approved the concept of e-government. The objective of the e-government concept is to develop effective means that will allow for adapting of public administration to modern needs.* To achieve this purpose, the Lithuanian government identified e-government's implementation as one of political priorities. One step toward this purpose is the development of e-government, which ensures democracy, the promotion of e-business, the computerization of society, and the use of the Internet. Following the e-government concept's adoption, the Ministry of Interior affairs has been obliged to prepare a plan of measures necessary for implementation of the concept. The e-government concept describes the official approach towards the electronic government's phenomena in Lithuania.

## BACKGROUND

"[E-g]overnment enables and requires rethinking [of] how government is organized from the perspective of the [c]itizen and the functions the government performs to serve the needs of [the c]itizen." This is the excerption from the presentation of Lithuanian Prime Minister A. M. Brazauskas in World Information Technology Forum WITFOR'2003. The excerpt shows the necessity of e-government, which includes not only the implementation by IT means in public service, but also requires transforming the whole process of public administration in order to satisfy consumers' needs and ensures new quality in the relationship between public administration institutions and citizens or business subjects. Business firms, market conditions, and the culture and institutions of society need to undergo substantial change in a coordinated manner for ICT to diffuse throughout the whole economy in a way that supports the development of virtual community. It is the dynamic interdependence of these conditions that is the source of innovation and value creation in the new knowledge-driven economy. The agenda of research on the dynamics of adoption of new economy practices, innovation, and economic growth, as a result, needs to be expanded beyond the level of the firm. It needs to be built around the dynamic interrelationships between technological transformations, firms' organisational and knowledge-creating capabilities, emerging market and industry structures, and public institutions (Castels, 2000). Effective working of e-government may be possible only if it has the most important components: public administration, legal regulations, modern and safe ICT means of implementation, customers' possibilities and skills in use of ICT means (Wimmer, 2001). Therefore, this is the approach we use while preparing and implementing e-government in Lithuania. Without all of these components, it may not give the expected benefit, and also, it may be damaging.

## E-GOVERNMENT DEVELOPMENT IN LITHUANIA

### Legal Framework

Legislation of legal instruments doesn't make any essential problems for the implementation of public services in electronic means. The written document form and the electronic form are consolidated by technological neutrality and functional equivalence in Lithuania's Republic Civil Code, Public administration statute, and Archives statute. In the Civil Code of Lithuania's Republic, article 198 states that the document in electronic form is equal to the document in written form (for example, electronic data message, etc.), which includes these requirements:

- If it is transferred in telecommunication peripheral device
- If it is made by computer and saved in material medium in electronic form (if it's not for disposal)
- If the text protection is guaranteed (the function is done by electronic signature and other forms of data coding or blocking
- It is possible to identify the signature

In any case, the electronic document cannot be less worth than the paper document because of:

- It is electronic
- It has electronic signature

- It is transferred by telecommunication peripheral device
- It is made by computer and saved in material medium in electronic form

It is very important to state that the "written form" of a document in various public administration statutes cannot be evaluated as the one making troubles for usage and acceptance of the electronic form of a document. The assumption leads us to implementation of public electronic service (World Bank, 2003).

The attitude is certified by the change of Archives statute on March 30, 2004. The change consolidates common notion of a document without correlating it with the form of a document. It means that "a document" is the information stated by a legal or natural person in action despite its presentation, form, or medium.

Nevertheless, there are no essential difficulties in general statutes of Lithuania's Republic, although in statutes, which controls specific actions and act under statutes are some obstructions for services in distance in electronic way.

The Public Procurement statute is concerned with EU directives, but some of its attitudes may serve as disadvantages for transferring public procurement into electronic space. These attitudes concern submission of requisitions and proposals. Although the statute allows giving proposals for government electronicall, but on the other hand, the proposal has to be certified by other than electronic means. The detailed regulation of opening envelopes of proposals for electronic public procurement makes noticeable disadvantages.

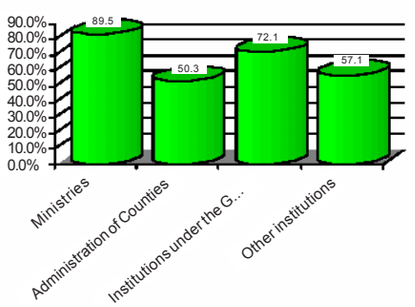
We may find in some statutes that the document in electronic form is not discriminated itself but the critics go to how the document is presented. There are some difficulties in transferring documents electronically, for example it is foreseen that the document may be transferred only by post, or some attitudes demand physical contact in transferring documents.

Another obstruction for electronic service is the requirement of special documents or property, such as a company's seal procuration, a personal passport or ID card, a driver's license, and so forth. It's possible to avoid these difficulties if we implement secure transferring of data from the data bases of public registry information systems or competent state institutions.

## Public Service

The public service survey was made in the end of 2003. Also state and self-government institutions on the Internet were evaluated on how they follow general requirements approved by the government of the Republic of Lithuania.

*Figure 1. Conformity Internet Web sites of the public authorities*




Public electronic service is usually available on the Internet. In the beginning of 2003, the government of Lithuania certified general requirements for state institution Web pages on purpose to standardize state institution Web pages, to secure their functioning, information actualities, trustiness, search possibilities, and so on. These requirements predict state institution Web pages on structure, information, administration, and appliance for disabled (SIC, 2004).

The survey exposed that general requirements are mostly fulfilled by Web pages of ministries—about 82%, counties administration Web pages—52%, institutions under the government of the Republic of Lithuania—64%, 7%, other institutions—63%. Information relevance and network application on WAP data transferring protocol have scanty accordance on the requirements.

Survey of juridical regulation and technological electronic service were done by an evaluation of European Community certified 20 public services (12 for citizens and 8 for business) rendering. Some of the services were parted, so then the general average was taken for evaluation. The level of public electronic service was evaluated sustained by Cap Gemini Ernst & Young's offered method, when the level of maturity is evaluated in stage 0—0%, stage 1 (information via Internet)—25%, stage 2 (one way interaction)—50%, stage 3 (two way interaction)—75%, stage 4 (full electronic case handling)—100%. In the end of 2003, the general public service rate was 43.8%. The services for business subjects proceeded faster—public services for citizens—average of 35%, and for business—average of 52.2%. The highest level of service (100%) for citizens is given by library, while searching in catalogues and presenting full text electronic publications. In business area, the highest level of service is extended by social fee for employers and submission statistical reports. Twenty-eight percent of all Internet consumers or 5.8% of the entire Lithuanian population applied at least once via Internet to public administration institutions during the year 2003. The research presented that more than half (53%) of consumers visiting public administra-

tion institution Web pages tried to know planned juridical acts projects and offer suggestions for its development. And only 17% applied to state or municipality officers responsible for relevant questions. (Ekonomines kosultacijos ir tyrimai, 2004).

Communication via Internet among citizens and business enterprises with public administration institutions is still not very active in Lithuania. Communication is influenced by a low rate of Internet use as well as incomplete information about Internet services (•ilionien, 2004).

All central authority and self-governance public electronic service is available on the Internet "Electronical Gateway of the Government" (www.govonline.lt, www.evaldzia.lt, www.epaslaugos.lt).

The first year after State Tax Inspectorate implemented electronic declaration systems, the income of 2003 declared via Internet more than 10% of all persons obligated to declare. Most of the institutions under the government of Lithuania (about 70%) had certified the documents of implementation in electronic service on the Internet or had planned to do so in the near future.

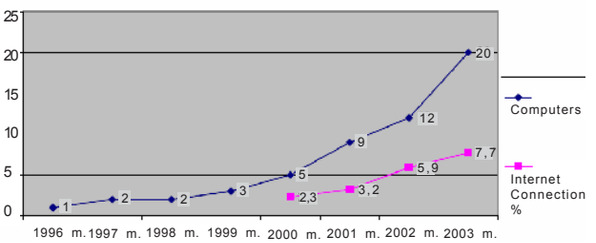
## Market Issues

The efficiency of public service on the Internet is influenced by society's possibilities and capabilities of using the service. Lately, the use of computers and the Internet has increased notably. Thirty-nine percent of inhabitants between the ages of 15-74 had used a computer (1st quarter—37%) in the second quarter of year 2003 in Lithuania. At the same time, 27% of inhabitants between the ages 15-74 of all residents in the state used the Internet (1st quarter—24%). And almost a quarter (23% or more than 600,000) state inhabitants used the Internet regularly; it means once a week or even more often (SIBIS, 2004).

The main locality for Internet use is usually the workplace. According to the data of the third quarter of 2003, 41% of all respondents use the Internet at work, 29% at home, 26% in educational institutions, and 20% in public Internet use places (for example, Internet bars, public Internet centers, etc.). The strong tendency is that computers and the Internet are used by mostly young people with high incomes who live in cities (SIBIS, 2004).

In 2003, Lithuania was characterized by the fastest Internet development in Baltic region: The number of consumers has increased to 25% (20-25% Internet consumers among state citizens). In the last three years, Internet consumer dynamics in newly joined EU countries were not as fast growing as in Lithuania. In two years, the number of Internet consumers has increased twice from the general number of the population, while in other CEE countries the growth was not so high (on average the growth was about 2-3% per year) (SIBIS, 2004).

*Figure 2. Increasing number of household computers and Internet connection 1996-2003m*




At the end of 2003, there were more than 350 public Internet access points in Lithuania where the service was free of charge. Public Internet access points are sustained by "public-private partnership." The government of Lithuania supported the initiative for private business alliance "Window to the Future." In 2003, 100 new public Internet access points from the state budget were established.

The rate of Internet usage at home is still comparatively low. In the third quarter of 2003, 20% of computers were in the household and Internet access was available in 8%. The results are influenced by the relationship between monthly household incomes and computer price. More than a third of households who don't have Internet access state that the equipment is too expensive and a quarter of them declare connection is expensive (high rate, subscription) (SIBIS, 2004).

# FUTURE TRENDS

## Governance

The government of Lithuania expressed its position for e-government implementation in the end of 2002, while they certified the concept of e-government, and in 2003 when they confirmed the action plan of the implementation. All state institutions of Lithuania are obligated to participate in organizing and implementing e-government projects. The Information Society Development Committee under the government of the Republic of Lithuania is responsible for e-government project coordination and observation. Strategic decisions are accepted in the Commission of Information Society Development, chaired by the prime minister.

The concept of electronic government implementation foresees general organizational and concrete state or municipality institutions' means for public service

using IT. The e-government action plan for implementation includes four groups of the nearest works: (1) juridical and organizational means, (2) creation of personal identification system, (3) technological development, (4) establishment of electronic service infrastructure.

## The Development of Public Administration

Lithuania's governmental institutions are responsible for a wide proceeding spectrum in relation with the state inhabitants and business entities. These functions were administrated by separate and independent public administration institutions and its subdivisions, if to look at historical point of view. There's also juridical proceeding repartition among the national, regional, and municipality governance level, which involves public and private juridical persons in public service. These factors cause parted public sector, which doesn't supply customers to be served applying in one institution but our citizens got used to get complex service in developing private business service.

The electronic government concept consolidated the one-stop shopping principle for public service. The principle appeals to public service integration oriented to a client. The research exposed that the main disadvantages are for complex public rules and confused procedures of many documents from various departments. These documents may be changed in interdepartmental data flows, and these procedures are defined in public administration acts. For example, when the individual applies to the social allowance, he or she needs to bring eight additional documents from the different public institutions. All this information could be collected by data flow channels, of course. The best decision appears to be one-stop shopping principle service by electronic means.

## Personal Identification

Electronic public service and IT security are very close. Certified government IT security implementation plan, IT security juridical regulation, consolidating main governmental functions security, foresee training skills of representatives' data security and ensure IT security implementation control.

Lately in Lithuania, electronic personal identification systems are widely used by business service structures and especially banks. E-government often is compared with e-business because both use the same facility, hardware, or software. However, there are essential differences between public and private sector proceeding models, which influence requirements for technical applications. The public service proceeding is related to juridical acts and the realization of responsibilities. Decisions are usually formalized hard because of influence of circumstances and the position of public interest as quality is more important than effectiveness. All public service impacted this way, when it is necessary to ensure inhabitants' privacy, data integrity in guarantee that public service would be for that person who asked for but not offending society interests. Personal identification and its data transferring integrity guarantee is the main assumption for 3rd and 4th interaction level and then the electronic signature becomes one of the main tools.

But we have to confess that's impossible to ensure consumer that his data transferred to public administration institution wouldn't be changed while we use personal identification means only. So then the institution becomes responsible to the consumer for his data retention. So the perspective of PKI technology remains, especially transferring special services for responsibility of documents perfection to electronic environment, but anyway security technologies would be selected by the risk factor. PKI technology electronic signature is implemented in electronic correspondence among the state institutions in tentative project.

## E-Inclusion

Much attention is given to balanced possibilities for all inhabitants to use IT and to involve a bigger part of the society in electronic consumers. The effort is of equal possibilities to all Lithuanian citizens to use the Internet and get accordant abilities to use IT means. The number of Lithuania's inhabitants who have computers and Internet access at home is not high (2003 accordingly 20% and 8%). Remarkable disjuncture is seen between the Internet consumers at home in Lithuania's largest cities and countryside (accordingly 16% and 1%). In Lithuania although Lithuanian GDP growth remains one of the highest in Europe and in 2003 it reached 9%, also in 2004 I st. quarter 7, 5%. But the real incomes of inhabitants cannot ensure that Lithuania will reach the rates of old EU countries average on the Internet connection. So if we wish to trace more people to use the Internet, Lithuania concentrates the problem in two directions: in applying franchise for people buying computers and Internet access and for establishing public Internet access points (PIAP). Seimas of the Republic of Lithuania considers Inhabitants incomes taxes statute's correction, which declares that inhabitants could pay part of computer or connection to the Internet price from the income-tax. By the project decree, there's foreseen to compensate about 29% price of computer and Internet connection for inhab-

itants. PIAP—is several computers working with Internet access where everyone may use it tax free in public places. The establishment of PIAP is organized by "public-private partnership" principle. The government collaborates with large private banks, telecommunications and IT companies alliance "Window to the future." PIAP is established in main cities from private capital finance and from state finance PIAP is formed in regions, where the number of Internet consumer is very low. It's anticipated to establish about 1000 PIAP till the end of 2005 in Lithuania, and it means that in almost all settlements to 1000 inhabitants PIAP would be working.

## CONCLUSION

E-government as socio-technical system is interrelated into network of knowledge stakeholders such as humans, machine agents, and artifacts like norms, laws, formal procedures, social and cultural practices, etc. Lithuania is facing just the first steps towards putting e-government into practice.

The concept of e-government outlines that e-government is a mean of government reforms and in the future it will help to proceed the development of public functions. One of the nearest purposes of Lithuania's government is all public services to transport into the Internet at the before mentioned third level till 2005. It is possible to do with equivalent development and one integral management of all responsible institutions.

The technological disadvantage related with slaw Internet, old software and its inconsistent, the lack of knowledge put the breaks. The sponsorship is a relevant question too. The public institutions declare that it is not enough support implementation and development of e-services. The problem is lack of competence, knowledge and ability to manage e-government implementation processes.

Effective information management and the creation of improved relations with consumers, partners, and suppliers can help to move the circle on: the government operates with private sector by creating business models, infrastructure and by providing services to end-users in public sector will help to develop e-government.

The implementation of e-government conception is just a little step toward good working e-government. Inevitable difficulties are emerged in the fields of changing models of decision-making, insufficient skills, information and communication infrastructure. There is need of permanent actions in this process, which will ensure: accessibility, trust, privacy, transparency, security, education, marketing and so on.

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## KEY TERMS

**E-Government:** E-government refers to the use by government agencies of information technologies (such as wide area networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management.

**E-Inclusion:** E-inclusion is a social movement whose goal is to end the digital divide, a term used to describe the fact that the world can be divided into people who do and people who don't have access to—and the capability to use—modern information technology.

**Information and Communication Technology (ICT):** Includes ICT equipment (computer hardware, end user communications equipment office equipment and datacom and network equipment) plus software products, IT service and carrier services.

**One-Stop Shopping:** Public service integration which oriented to a client.

**Public Services:** Public sector is any part of a country's economy that is controlled or operated by the state or local government. The public sector often includes public services such as education or healthcare, and nationalized (government owned) companies and industries.

**Transition Economy:** Country that is moving from socialist toward a market (capitalist) economy.

# E-Government Issues in Switzerland

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## INTRODUCTION

This short article gives an overview of e-government in Switzerland about 10 years after its introduction at the municipal, cantonal and federal levels. It outlines the technical and political difficulties recently encountered for the further development of online services at all levels and presents some good examples of what has been achieved so far. Opportunities for e-participation are also presented as a growing trend based on a few e-voting experiments at cantonal level. Since Switzerland is a multicultural country with four national languages, some of its e-government experiences and "lessons learned" can be useful in neighbouring countries with the same cultural background (i.e., Austria, France, Germany, and Italy).

## BACKGROUND

The term "e-government" (*cyberadministration* in French, *governo elettronico* in Italian, but interestingly, *e-government* in German on the site www.admin.ch/ch/d/egov) has been used in Switzerland (and its national languages) for around 10 years now: the first public Internet sites were launched by the city of Geneva and the Canton of Basel in December 1994. As of 1995, the Confederation inaugurated its main site, (www.admin.ch), to which were grafted, little by little, the seven Federal ministries. By the end of 1999, all the Swiss Cantons had official sites. In 2005, nearly all Swiss municipalities had a homepage. Only 59% of them, however, have a well developed site, whereas the others make do with mini-sites hosted by the Confederation or by their Canton. Today, a directory of official Internet sites in the public sector that is maintained by IDHEAP (www.gov.ch) contains around 2000 URLs. On an international level, Switzerland position has worsened over the past years: From 7$^{th}$ (in 2003) to 9$^{th}$ (in 2004) place in the World Economic Forum Network Readiness Index (WEF, 2005); from 15$^{th}$ to 20$^{th}$ place in the European Union Online Availability of Services study (DGISM, 2004), and from 11$^{th}$ to 62$^{nd}$ place in the Brown University Global E-Government Study (Brown University, 2004). See also (eVanti.ch, 2005).

Despite the efforts made over these 10 years, the barometer of e-government published in 2005 by the University of Applied Sciences, Bern (Brücher & Biswanger, 2004) reveals that public Internet sites are not well known by the population: the figures range from 51% of those taking the survey being aware of their cities' sites, to 41% for their canton's site, to 29% of them for the Confederation's site, and only 6% for the Swiss "national" portal, www.ch.ch. Moreover, the existing sites are only used by 14% of inhabitants, although 80% of the population has Internet access at their homes or offices. In addition, half of the surfers do not trust these public sites sufficiently to entrust them with their data. Finally there are few administrative services available online on a transactional basis: 493 communes offer such e-procedures out of 1,822 communes with a Web site, and only nine of them have more than 10 e-procedures (Barbey & Abbet, 2004).

Good examples of e-government, nevertheless, exist in Switzerland (see the following paragraph), and there is a need for sharing these among specialists. This, notably, is the role of the eVanti project (www.eVanti.ch), an initiative on the part of the Swiss Confederation that is similar to the approaches taken in the European Union (Good Practice Framework) and in the United States of America (Best Practices Committee). The conferences organised in 2004 and 2005 by eVanti.ch, presented a first qualitative panorama of what is taking place in the cantons and cities of Switzerland, as well as at Federal level (see for example, eVanti.ch, 2004a, 2004b, and 2005). A common language is necessary, and if possible, one exempt of poorly-understood American-English terminology. We should drop the "e" in front of each concept, as suggested by a seminal European report (Leitner, 2003), and concentrate on a comprehension of the "Internetisation" phenomenon in the public sector, in Switzerland as abroad.

## THE SWISS E-GOVERNMENT ICEBERG

On the basis of the experiences presented during the evanti conferences, we can affirm that an "e-government iceberg" exists in Switzerland as in many countries. The tip that is visible is constituted by the technical problems that this type of high-tech project cannot fail to encounter

and that often overwhelm discussion of it. But, as is the case for all icebergs, the part below the surface—meaning the other problems—is even larger than the part that is visible. There are in fact a multitude of other problems.

First of all, the bubble of the "new economy" exploded at the beginning of the 21st century, and there is now less enthusiasm for the Internet and thus also for its use by administrative entities. We have seen that there is little popular interest for the public sites, and this has led to a lack of interest on the part of the politicians who must vote budgets and lead projects. Moreover, the crisis within Swiss public finances at all levels no longer makes it possible to release the budgets essential to developing sophisticated sites. There are sometimes legal grey zones (Brücher, 2004). We also note a lack of co-operation in this area between the municipalities and their Cantons, with notable exceptions such as the Glarus Canton and the Neuchâtel site with its secure portal (www.ne.ch) which is based on a 20-year-old IT co-operation between this canton and its 62 communes.

As Glassey and Chappelet (2003) revealed, a fair number of Internet strategies have been published by the authorities, but few are applied consistently. In many instances, it is a case of re-inventing the wheel rather than pooling tried and tested solutions. Most of the norms that the recently formed eCH association (www.ech.ch) is to draw up are not yet available. In short, then, e-government in Switzerland—as is also frequently the case elsewhere—is still far too much the domain of information technology experts and not that of users and decision-makers. The same errors made during the early stages of introducing information technology into the administrations during the 1970s and 1980s are recurring.

On a more political level, many think that federalism, a form of Government which is engrained in the Swiss political system, is a hindrance to the development of e-government in Switzerland (Melillo, 2005). To follow this line, however, one would have to explain why such federalist countries such as Austria and Canada are on top of the e-government rankings. It is more likely that the causes of Swiss e-government difficulties can be found elsewhere, for example in the lack of a single national identification number for inhabitants, in the total lack of coordination of the IT infrastructure between the Swiss cantons and Confederation, in the lack of a federal e-government law, as well as in the very slow start of digital signature schemes (OFCOM, 2004, p. 38).

## SOME SOLUTIONS

Opportunities for a better e-government in Switzerland nevertheless abound. On a front office level, it is a case of facilitating relations with those administered in order to make these relations more practical and more user-friendly. The Canton of Vaud's Land Registry and its over three thousands daily subscriber visits is a good example (www.rf.vd.ch). In back office terms, it is a question of improving productivity and co-operation within the public service and of rendering administrative procedures transparent for those who use them. The CAMAC application, inaugurated in 2000, remains an exemplary case (www.camac.ch). This site links around 30 administrative services within the Canton of Vaud, the municipalities and those who issue tenders for construction work for the purpose of issuing construction permits faster and within the 30-day limit set my the law.

These cases of "Internetisation" all have tremendous potential for being more efficient (and thus creating savings). But we should not draw the line at achieving efficiency alone. The application of the Internet within administration can also be a catalyst for State reform inspired by the Reinventing Government movement as of the 1990s (Chappelet, 2004). Indeed, many Swiss e-government projects have been influenced by the ideas of New Public Management (Schedler, Summermatter, & Schmidt, 2003). Some examples follow.

The State must today be close to those it governs, and more transparent. The Swiss virtual front office (www.ch.ch), which provides information to inhabitants on administrative services and points them to the right source of information and at the right level, contributes to improved proximity although it is not well known yet. After a costly start, it is being reengineered to better fill the citizens' and businesses' needs. According to the New Managerialism ideas, the State must also become more entrepreneurial. The Swiss public markets' information system (www.simap.ch) facilitates this objective by stimulating competition and transparency regarding the purchase of goods and services by the Cantons, the major cities, and soon the Confederation. The State must also open up to new forms of public service provision. The SIMAP Association is an example of this. We could also mention the Municipality of Montreux Internet site, which is entirely outsourced to a private portal (www.montreux.ch), or the public/private partnership "Schools on the Net" intended to equip Swiss schools with Internet access and the teachers with the knowledge to make better use of Internet resources in their courses (www.PPP-esn.ch). Finally, the State should be more aware of its citizens' opinions. The experiences surrounding electronic voting in the Cantons of Geneva (www.geneve.ch/ge-vote), Neuchâtel and Zurich are making progress in this direction.

## FUTURE TRENDS

This reform, this modernisation of the State thanks to the Internet, is improving the classical compromise between efficiency and transparency, between economy and democracy. The French expression *cyberadministration* is thus no longer sufficient to describe the phenomenon that is beginning before our very eyes, and that involves all levels of the State and branches of government. The term *cyberEtat* (e-State) would be more appropriate. The State is not, in fact, a provider of personalized, online services alone. It goes beyond just having "clients" (those under its administration) who expect a personalised service, for it must also serve communities of citizens who interact with it on a collective basis. The traditional State task of drawing up and preserving public information within a certain territory, with its population and its rules, is undergoing a profound change thanks to the advent of the Internet. The territory's information systems, health networks, legislative and judiciary compendiums and its harmonised registers of persons and buildings are all examples of the type of collective services in Switzerland that are being and will be made available on the Internet to an increasing extent.

These services can serve as the basis for a renewal of democracy, frequently referred to as "e-democracy." This does not mean electronic voting alone, of course, but above all, greater participation on the part of the population in the process of drawing up laws and public policies. This participation can develop thanks to the availability, via the Internet, of public information and documentation on the one hand, and of means of communicating with public officials and elected representatives on the other. The Swiss Parliament's site is exemplary in this connection thanks to its eDoc section, which contains all the working documents for parliament members and its bulletin covering meetings that is made available only a few hours after the debates have taken place, permitting netizens to react directly to what an elected representative has said (www.parlement.ch). And one-fourth of the Swiss Federal MPs respond quickly to their e-mails (Chappelet, 2005). Interactive tools such as those simulating the outcome of a vote or an election are becoming widespread on political Websites, and can contribute towards shedding light on the debate and to affecting the outcome (Chappelet & Kilchenmann, 2005).

## CONCLUSION

These new methods of dialogue among citizens, their elected representatives, and the administration herald a new form for the State, also in Switzerland. Modern States, in fact, believe themselves to be mediators between citizens and society. The Internet revolutionises this relationship, moreover, since it facilitates it and renders it more easily accessible and more global. Little by little, we perceive everywhere the emergence of a virtual State—one that is global and without a territory. Administrative frontiers are fading. And this is maybe through such a "virtual State" that the presently impossible mergers of Swiss cantons will become thinkable in the future.

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## KEY TERMS

**Cyberadministration:** The set of all public administration services offered on the Internet.

**Best Practices:** Successful e-government projects which can inspire similar projects.

**E-Government Iceberg:** A metaphorical view of the technical and non-technical problems encountered by e-government projects. The former (below the surface) are more important than the later (above the surface).

**E-Participation:** Participation of citizens through the Internet in the public affairs debates and decisions.

**Federalism:** A mode of state organisation used in several countries including Switzerland.

**Identification Number:** A number assigned to persons or businesses in order to identify them in a unique way within public administration departments.

**New Managerialism:** Set of ideas developed in the 1990s to apply the methods and techniques of management to public administration.

# E-Government Program of the Belgian Social Security

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## INTRODUCTION

The Belgian social security consists on the one hand of three insurance systems (workers, self-employed workers, and civil servants), that cover a maximum of seven social risks (incapacity for work, industrial accident, occupational disease, unemployment, old age, child care and holiday pay—the so-called branches of social security), and on the other hand of four assistance systems (subsidies for the handicapped, guaranteed family allowance, minimum income, and income guarantee for the elderly), that grant people specific minimum services after checking their subsistence resources. In addition, a lot of public institutions at the national, regional or local level, or private companies entrusted with missions of general interest (e.g., energy, water, or public transport companies) grant benefits (e.g. tax or price reductions, free passes for public transport, etc.) to citizens based on their social security status.

In total, about 2,000 actors are responsible for the provision of social security and social protection in Belgium. More than 10 million citizens and 230,000 employers have very frequent contacts with those actors to claim their entitlements, provide information and pay their contributions.

## BACKGROUND

In the mid-1980s, an in-depth analysis of the functioning of social security proved that (Robben & Deprest, 2003):

- The organization of social security offices' business processes was not very customer-oriented and was certainly not coordinated among the various offices.
- Each social security office had its own set of paper forms with accompanying instructions, on the basis of which information was requested that was specifically necessary to calculate the particular contributions or grant the entitlements in the light of the particular social risk; in total some 80 different paper forms were used for data exchange between citizens and employers on the one hand and social security offices on the other with a total of about 2,000 pages of instructions.
- No possibility existed for an interactive exchange of data between the citizens and employers on the one hand, and the social security offices on the other.
- A direct exchange of electronic data was also not possible between the personnel administration software of an employer and the information systems of the social security offices, which led to an unnecessary and error-prone manual re-input of information.
- Social security offices very often asked the citizens and their employers to request information that was already available at another social security office in the form of a paper document, and to produce that document, rather than exchanging the information directly among themselves.
- Citizens and their employers thus had to inform many social security offices of a single event, following different legal concepts and administrative instructions each time.
- Since the exchange of data occurred on paper, processing was expensive and time-consuming.
- Citizens and their employers themselves had to claim their entitlements throughout the social security system and could not count on the automatic granting of all entitlements on the basis of a single declaration.

- Citizens and their employers did not have the necessary tools for checking the quality of the information before this was reported to the social security offices; this resulted in a relatively high percentage of errors and numerous subsequent contacts for the correction of errors, which could have been avoided.
- This all led to a very heavy administrative load and accompanying expenses for employers, which resulted in a brake on entrepreneurship, a smooth economic development, and growth in employment.

## PRIORITIES AND PURPOSES

The overall goals of the e-government program of the Belgian social sector are:

- to grant effective and efficient services with a minimum of administrative formalities and costs for all involved;
- to improve and radically reorganize the service delivery processes amongst the actors in the social sector, and between those actors on the on hand and the citizens and the employers on the other hand;
- to promote information security and privacy protection by the actors so that all the involved actors, citizens and employers can have justified confidence in the system; and
- to deliver integrated statistical information to the politicians and the researchers in order to support the social policy.

## STRATEGIC USE OF INFORMATION

Information is a prime production factor for most government bodies. Government revenues such as taxes and social security contributions depend on data about the income of citizens and company revenues; elections can only be held based on information about people residing within a country's borders; benefits and subsidies are granted taking information about the living circumstances of the duly authorized person and his/her direct environment into account, and so forth.

Thus, it is very important that all government bodies deal with information as a strategic resource. This implies effective and efficient treatment of information in compliance with basic data protection regulations, such as the Directive 95/46/EC of the European Parliament and of the Council of October 24, 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data (Official Journal, 1995).

The e-government approach within the Belgian social security sector (http://www.law.kuleuven.ac.be/icri/frobben) is based on a clear vision of the use of information as a strategic resource:

- **Information Modeling:** Information is modeled in a coordinated way so that the model fits as closely as possible to the real world. By doing so, changes to the information model due to changing legal environments are avoided. This modeling takes into account as much as possible the expected use cases for the information. It can be extended and adapted flexibly when the real world or the use cases of information change.
- **Unique Collection and Reuse of Information:** Information is only collected by a social security institution for well-defined purposes and in a proportional way to these purposes. All information is collected only once, as closely as possible to the authentic source. This way of proceeding avoids the frequently repeated identical questioning of the citizens or the companies by several actors in the social sector. The collection occurs via a channel selected by the person from whom the information is collected, but preferably in an electronic way, using uniform services such as single sign on, notification of receipt for each message, and so forth. Information is collected according to the information model and on the basis of uniform administrative instructions operational for all actors in the social sector. Ideally, the supplier of information has the possibility of controlling the quality of information before its transmission to an actor in the social sector. This requires the public availability of software to check this quality. The collected information is validated once in compliance with an established distribution of tasks, by the most entitled institution or by the institution that has the most interest in a correct validation. Information is shared with and reused by the authorized users after the validation process.
- **Management of Information:** A functional task sharing is established indicating which institution stores and manages which kind of information in authentic form and makes it available to all authorized users. Information is stored in compliance with the information model. Information can be flexibly assembled according to ever changing legal concepts, which have to refer to the information model. Each institution has to report probable improprieties of information to the institution that is designated to validate the information. Each institution that has to validate information according to the agreed task sharing must examine the reported probable improprieties, correct them when necessary, and communicate the

correct information to every known interested actor in the social sector. Information is only retained and managed as long as there exists a business need, a legislative or policy requirement, or as long as it has historical or archival value, and then it is preferably presented in an anonymous or encoded way.

- **Electronic Exchange of Information:** Once collected and validated, information is stored, managed and exchanged electronically to avoid transcribing and reentering it manually. Electronic information exchange occurs using a functional and technical interoperability framework which evolves permanently but gradually according to open market standards, and is independent of the methods of information exchange. Electronic information exchange can be initiated by the institution that possesses information, by the institution that needs information or by the institution that manages the interoperability framework, in this instance the Crossroads Bank for Social Security (CBSS). The available information is used proactively for automatic granting of benefits, for prefiling when collecting information and for providing information to the persons concerned.
- **Protection of Information:** Security, integrity and confidentiality of information are ensured by integrating ICT measures with structural, organizational, physical, personnel screening, and other security measures according to agreed policies. Personal data are used for purposes compatible with the purposes of the data collection and are only accessible to authorized institutions and users according to business needs, legislative, or policy requirement. The access authorization to personal data is granted by an independent committee, after having checked whether the access conditions are met. The access authorizations are public. Every concrete electronic exchange of personal data is previously tested for compliance with the applicable access authorizations by an independent institution managing the interoperability framework, in this instance the Crossroads Bank for Social Security. Every concrete electronic exchange of personal data is logged, to be able to trace possible abuse afterwards. Each time the information is used for a decision, the information used is communicated to the person concerned together with the decision. Each person has the right to access and to correct his own personal data.

## CONCRETE RESULTS

Taking the above mentioned principles into account, a global review of the processes throughout the whole social security system has been carried out (Van Der Vorst, 2004; Viaene, Robben, Lahaye, & Vansteenberge, 1986). To improve the service delivery to the citizens and the companies, the Crossroads Bank for Social Security was created in 1991. The mission of CBSS is to be the motor of e-government in the social sector (http://www.ksz-bcss.fgov.be).

The Crossroads Bank for Social Security manages and uses a reference directory, showing:

- which persons/companies have personal files in which social security offices for which periods of time, and in which capacity they are registered;
- which information/services are available at any social security office depending on the capacity in which a person/company is registered at each social security office;
- which kind of information/service can be accessed, in what situation and for what period of time depending on in which capacity the person/company is registered with the social security office that accesses the information/service; and
- which users/applications want to automatically receive what services in what situations for which persons/companies in which capacity.

The Crossroads Bank for Social Security uses this reference directory

- to ensure preventively that a social security office only gains access to data it is allowed to access, and on people who are known to it;
- to route data requests to the social security office that can supply the data in question; and
- to transmit data reported automatically to the social security offices that can use the data in question to fulfil their duties.

The actual result can be summarized as follows (Robben & Deprest, 2003):

- All social security offices are connected to a network for electronic information exchange managed by the Crossroads Bank for Social Security, and have a legal obligation to request all information available in the network from each other electronically; they can mutually consult their databases and exchange electronic messages.
- Socially insured persons and their employers now need to make only a single declaration to the social security system as a whole in the following cases:
  - No later than the start of an employment relationship, an employer has to declare when

(date and time) the employee in question takes up his or her duties.
- Every three months, the employer has to declare what income each member of his staff has earned.
- When a social risk occurs, socially insured persons or their employers need only to declare information about that particular social risk.
- No later than the end of an employment relationship, an employer has to declare when (date and time) the employee in question leaves the company.

More concretely, the introduction of this system led to the following (Robben & Deprest, 2003):

- About 181 types of paper documents which citizens or their employers had to request from one social security office to pass to another social security office have been abolished and replaced by direct electronic data exchanges between the actors in the social sector; in 2005, 500 million electronic messages were exchanged.
- About 50 types of social security declaration forms have been abolished.
- In the remaining 30 social security declaration forms the number of headings has been reduced on average to a third of the previous number.
- Many declarations are made directly and electronically from employers' staff administration software packs and accountancy software packs.
- Citizens and their employers can make all social security declarations on the basis of standardized concepts and standardized instructions, and need to report data to the social sector as a whole only once.
- The number of contacts between the citizens and their employers on the one hand and the social sector on the other, has been drastically reduced, with a significant time gain as the result.
- Personal services to citizens and companies are offered.
- A huge number of social benefits and subsidiary rights are automatically granted without citizens or their employers having to make declarations anymore.
- Hospitals and pharmacists are freed from encoding about 100 million paper certificates a year concerning the insurance status in the healthcare sector; they now can read them electronically on the social identity card.
- According to a study executed by the Belgian Federal Planning Bureau, the rationalization of the data exchange processes between the employers and the social security offices implies an annual saving of administrative costs of more than 1 billion euros a year for the employers.

## SUSTAINABILITY AND TRANSFERABILITY

The Crossroads Bank for Social Security actively shares its experiences with interested institutions in Belgium and abroad. The approach has been described in several public documents and has received a Good Practice Label within the e-government Good Practice Framework set up by the DG Information Society & Media of the European Commission.

In 2001, the general manager of the Crossroads Bank for Social Security was asked by the Belgian federal government to elaborate an e-government plan for the federal public services, based on the successful experiences in the social sector. This plan, that is now being executed and permanently updated by the Strategy Cell Federal Civil Service Information and Communication Technology (FEDICT), has extended the above mentioned vision of the use of information as a strategic resource to the whole Belgian public sector and contained, amongst others, concrete projects such as the delivery of an electronic identity card to all citizens, and the creation of a Company Register, of a federal service bus, and of an integrated portal environment.

## FUTURE TRENDS

On its own initiative or on demand, the Crossroads Bank for Social Security will continue to extend its services to all actors in the social sector and to stimulate the reengineering of service delivery processes by creating value chains for the citizens and the companies based on a combination of back office integration and a user friendly front office. More concretely, the following projects are being executed

- The back office integration is continuously being extended to all public social welfare centers, to the sectoral complementary pension funds (private schemes supplementary to the legal old age schemes), to the institutions of the communities and regions entrusted with social missions, to the municipalities and cities and to the healthcare professionals; about 40 new types of electronic messages are planned.

- The automatic granting of benefits based on the social security status of a person will be generalized; indeed, a recently published law states that people who are entitled to complementary benefits on the basis of their social security status, as, for instance, a tax reduction, reduced telephone charges or a free pass for public transport, must not be asked anymore to submit a certificate; they are allowed to refuse the delivery of a certificate without losing the benefit; the institution that grants the complementary benefit has to consult the Crossroads Bank for Social Security to get information on the social security status.
- The Crossroads Bank for Social Security has proposed to the federal government the concept of the prefiled tax declaration of the natural persons; concretely, the tax declarations would be partially completed on the base of the data available in the social security network before being sent or presented on a portal to the natural persons; this would be a great step forward into administrative simplification.
- New electronic transactions will be developed for three target groups: the citizens, the companies, and the professionals of the social sector (e.g., the healthcare professionals); the transactions will be put at their disposal in an application to application mode or via portal sites; about 30 new transactions are planned, such as the online consultation of files and the online calculation of benefits; in that respect the electronic identity card will be used for electronic authentication and putting electronic signatures.
- The service delivery to citizens and companies will become multichannel enabled and be based on an integrated customer relation management; the services will be more personalized and self-service will be promoted
- Electronic payment facilities will be integrated in the service delivery.
- The use of the actual social identity card (the so-called SIS card) by all healthcare professionals will be promoted; the connection of the healthcare professionals to the network will also be stimulated; once these connections will be generally implemented and the electronic identity card will be delivered to all citizens, the social identity card can be abolished; the identification function will be taken over by the electronic identity card and the insurance status will be accessible via the network.
- An integrated e-workspace will be developed for the personnel of the actors in the social sector supporting among others knowledge management, document management, work flows, program and project management, e-communities, e-learning, and the labour relation; the e-workspace will be accessible to authorized users from anywhere and at any time by the use of a Web browser.

## CONCLUSION

The Belgian case was mentioned as a best practice in recent Web-based surveys on electronic public services ordered by the European Commission (Cap Gemini Ernst & Young, 2003). The success of the e-government program of the Belgian social security is due to the respect of a number of basic principles. As a conclusion, we want to put them forward as recommendations.

Do not look at e-government as a pure ICT event. Put the emphasis on an improvement of services and use a multidisciplinary approach. Have a good insight into the surroundings, the critical success factors and the stakeholders. Define a long term vision on integrated, customer-oriented service delivery, management of information as a strategic resource for all government activity, and interoperability. Optimize processes within each government institution, at each government level, and across government levels before their automatization. Standardize concepts and, where necessary, adapt regulation. Pay attention to change management, communication, and training.

Combine a long-term vision, profound process optimization and quick wins. Quick wins are useful to prove the efficiency of e-government and to motivate the public sector to change, but they have to fit with the long term vision. A race for quick wins does not stimulate development of well conceived systems based on reengineering.

Make the vision enforceable by citizens and companies and among government institutions, by formalizing it in regulation. Also adopt regulation to introduce uniform definitions of the information elements and attributes and the definition of legal concepts that refer only to the defined information elements and attributes, and to adequately regulate aspects such as privacy protection, information security, the protection against ICT crime, unique identification keys, the probative value of electronic information, the electronic signature, the equal access to public services, the transparency of administration, and so forth.

Make sure that available ICT components and information are reused to a maximum. Use already existing networks, means of electronic identification, authentication and authorization, interoperability frameworks and their accompanying basic services, portal environments, and the electronic information that is accessible from validated databases inside and outside of government. Through this, the efforts can be directed towards devel-

oping services with an added value, which are based on process improvements, while the multifunctional use of the same components is assured for all.

Also, develop multifunctional components, in conformity with open standards that are based on a flexible, modular, expandable, and service-oriented architecture, so that other developers of services can reuse the components.

See to a close cooperation with policymakers, other government departments, other governmental levels, users, mandated intermediaries and interest groups. Make sure that satisfactory consultations are held during regular contacts between the permanent representatives of the various stakeholders, so that a partnership is established.

Attune the service offer maximally to the needs and the logic of the users and involve them actively in the development of the services. Match the governmental processes with the own processes of the users. Assure user-friendliness.

Concentrate on a qualitative and interactive service offer, instead of a mere presence on the Web. Support users in the implementation of quality controls of the data, before these are transmitted to the government authorities, and use the available data proactively for an automatic granting of rights, prefiling of information in forms during data collection and a targeted provision of information to the users.

See to a good project management. Work incrementally and with prototyping, and give special attention to the roll-out by providing test and simulation environments, training and coaching for the users, and a multimodal contact center for the personal support of end-users.

See to it that proper measuring facilities are available, so as to assure permanent monitoring and improvement. Define the critical success factors in the area of performance, availability, quality, volumes, and effective use. Define the relevant measuring parameters for each of the critical success factors, the method and the frequency of such measurements for each indicator, and the reporting method. Assure that the measuring parameters are made available by the applications in the defined manner and in accordance with the frequency that was defined. Organize the follow-up procedures for measurement parameters, as a basis for permanent adaptation and improvement.

Make sure that the users have confidence in the electronic services that are provided. Develop an information security policy, which is designed to guarantee the availability, confidentiality, integrity, authenticity and auditability of the information systems. Give form to this information security policy in an integrated set of measures that warrant the basic principles with regard to information security.

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## KEY TERMS

**Crossroads Bank for Social Security (CBSS):** Public social security institution created in 1990; driving force and coordinator of e-government in the Belgian social security.

**E-Government:** Use of information and communication technologies (such as wide area networks, the Internet, and mobile computing) by government agencies with the capacity to transform relations with citizens, businesses, and other branches of government. These technologies can serve a variety of different ends: better delivery of government services to citizens (especially those living in remote or less densely-populated areas), improved dealings with business and industry, citizen empowerment through access to information, and more efficient government management. The resulting benefits may be greater convenience, increased transparency and accountability in public decisions, revenue growth, less fraud and/or cost reductions (World Bank).

**Service Integrator:** Body that is both the motor and coordinator of e-government initiatives at a specific government level or a specific sector of the public services.

**Single Sign-On:** Concept whereby a single action of user identification and authentication can permit a user to access several services or systems where he has access permission, and that are offered by one or more suppliers.

**Interoperability Framework:** Framework in which several systems can operate and communicate together by using common standards.

**Reference Directory:** A database containing the following information:

- which persons/companies have personal files in which government bodies for which periods of time, and in which capacity they are registered;
- which information/services are available at any government body depending on the capacity in which a person/company is registered at each government body;
- which kind of information/service can be accessed, in what situation and for what period of time depending on in which capacity the person/company is registered with the government body that accesses the information/service; and
- which users/applications want to automatically receive what services in what situations for which persons/companies in which capacity.

# E-Government Readiness in East and Southern Africa



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## INTRODUCTION

Governments in East and Southern Africa, like their counterparts in developing and developed world, are under increasing pressure from donor agencies and non-governmental organizations to improve service delivery to citizens and at the same time be able to demonstrate accountability and transparency in the management of public resources (International Records Management Trust, 2004). Most countries in East and Southern Africa, largely began to appreciate the importance of sound public record management practices during the 1980s and 1990s. This period experienced increased donor pressure especially from the World Bank and the International Monetary Fund (IMF) through their structural adjustment programmes (SAPS) that was exerted on the recipients of global donor funding in an attempt to remedy the economic hardships that characterise most developing countries including those in Africa. Structural Adjustment Programmes were meant to provide the best opportunity to implement public sector reforms in order to promote better use of public resources and enhance accountability by governments to their citizens (Wamukoya, 2000).

To meet the accountability and transparency demands of the global donor agencies and also the need to meet the increasing demands by citizens for efficient delivery of services, governments worldwide are now taking advantage of the revolution that is taking place in information and communications technologies especially the Internet, the personal computer, the mobile phone, and other modern communication devices. The concept of e-government in its simplest form is now the catchword that is increasingly being used to imply the delivery of government services online. Heeks (2002) defines e-government as the use of information and communication technologies (ICTs) to improve the activities of public sector organisations. E-government is claimed as an efficient means to streamline public sector functions and increase citizen participation in the running of public affairs (Wamukoya, 2000).

Governments in East and Southern Africa like their counterpart in a developed world, are increasingly turning to e-government to streamline public sector functions and increase citizen participation in the running of public affairs (Wamukoya, 2000). However, in an attempt to implement e-government projects, countries in East and Southern Africa face numerous challenges such as lack of requisite skills and competencies in e-records management; lack of enabling policy and legislative framework; lack of standards and formal methodologies for managing e-record; and inadequate infrastructure.

## BACKGROUND

The countries of sub-Saharan Africa in general and many public sector institutions are turning to e-government by moving online, and conducting business using e-mail and the Internet. This has implications for information management with regard to accountability, transparency, accuracy, reliability, and security. For the purpose of this article, the countries of East Africa will refer to Kenya, Uganda, and Tanzania under the umbrella of the East Africa Community (EAC), while those of Southern Africa under the banner of the South African Development Community (SADC) will include: Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. Tanzania is both a member of EAC and SADC.

## HISTORY OF E-GOVERNMENT

The European e-government observatory, that has the responsibility to provide a synopsis of the e-government situation and progress in Europe notes that the concept of e-government, became more pronounced in the 1990s

and was aimed at enhancing progress towards an information society status (IDABC, 2005) as customers increasingly expected government to be accessible and convenient. In Canada, for example, the Government Online strategy paved way for the creation of e-government services in 1999 (Public Works and Government Services Canada, 2004). On the other hand, in the United States, Government Paperwork Elimination Act of 1998 compelling federal agencies to provide the public with the option of submitting, maintaining, and disclosing required information electronically instead of on paper was a significant stimulus for e-government development (Relyea & Hogue, 2003).

In Asia, Wescott, Pizarro, and Schiavo-Campo (2001) point out that governments in the region are only in the initial phases of adopting information and communication technology to improve financial management, streamline the delivery of government services, enhance communication with the citizenry, and serve as a catalyst for empowering citizens to interact with the government. Similarly, in Africa, Heeks (2002) points out that though governments have been using information technology for more than 40 years, key innovations such as computer networks, intranets, and the Internet started to emerge on the continent in the late 1990s. E-government phenomenon is therefore a new paradigm sweeping government enclaves both in developed and developing world. Oyomno (1998) points out that e-government is still undergoing development to provide an overarching conceptual framework. He points out that the development of e-government has evolved from merely using advanced ICT to deliver public services through to electronic service delivery as a new way of doing business in government, to currently locating e-government within the context of the emergent information and knowledge age.

## MEASURING THE DEGREE OF E-GOVERNMENT

The degree of e-government can be measured along a continuum of five stages namely, emerging, enhanced, interactive, transactional, and fully integrated or seamless (UNDP, 2002). At the emerging stage, a country commits itself to becoming an e-government player. At this stage, it has formal limited Web presence with static organisation and political information. In East and Southern Africa, amongst the countries at this stage include: Angola, Botswana, Malawi, and Lesotho. Similarly, the enhanced stage comprises of countries whose online presence has content that is usually dynamic and specialised such as government publications and legislations and is frequently updated. Countries in East and Southern Africa include: Kenya, Namibia, Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe (UNDP, 2002). In contrast, the interactive stage is characterised by governments that have dramatic increase in access to a wide range of services, and capacity to search specialised databases, and download forms and applications. Within East and Southern Africa, only two countries, namely; Mauritius and South Africa have attained this degree of e-government (UNDP, 2002). Likewise, the transactional stage is characterized by governments that have secure transactions such as obtaining visas, passports, death records, licenses, and permits online. Within the East and Southern Africa region, only South Africa is reported to be moving towards this stage. At the seamless or fully integrated stage, the Website has capacity to access any service clustered along common needs in a unified environment. No country in East and Southern Africa has reached this stage (UNDP, 2002).

## E-READINESS PARADIGM

The degree of e-government depends largely on the level of e-readiness of the government concerned in various areas of its operations (Heeks, 2002). The concept of e-readiness like e-government emerged in the late 1990s when the term was first used by the Computer Systems Policy Project-CSPP (a public policy advocacy group of the United States information technology companies), when it developed the e-readiness assessment tool -the Readiness Guide for Living in the Networked World in 1998 to provide a unified framework to evaluate the breadth and depth of the digital divide at macro level between more and less developed countries. CSPP defines e-readiness with respect to a community that has high-speed access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities, and homes; user privacy and online security and government policies which are favourable to promoting connectedness and use of the network (Bridges.org, 2001). In contrast, the Centre for International Development at Harvard University, defines e-readiness in relation to a society that has, the necessary physical infrastructure (high bandwidth, reliability, and affordable prices); integrated ICTs throughout business, communities and government (Bridges.org, 2001).

Heeks (2002) points out that the lack of e-readiness, contributes to the lack and potential failure of e-government initiatives. He identifies types of e-readiness that need to be considered in e-government plans. They include: readiness of data systems infrastructure in terms of quantity, quality and security of use for supporting government online; readiness of the legal infrastructure in

terms of digital signature and the capacity to interact with citizens, businesses, and other stakeholders online; readiness of institutional infrastructure that sets up the framework for government online; readiness of financial resources in terms of the necessary funds to meet the first investments; readiness of human capital in public agencies in terms of needed skills to launch government online strategies; readiness of technological infrastructure in terms of needed computing and telecommunication facilities for connecting public agencies from different ministries and different levels of government among them and with other stakeholders; and readiness of the political and administrative leadership to give vision and direction to government online initiatives.

Choucri et al. (2003) pointed out that the concept of e-readiness means different things to different people, in different contexts, and for different purposes. Consequently, as a result of the lack of unanimity on the definition of the term of e-readiness, a large gap exists between ideas and concepts, on the one hand, and practical applications and implications, on the other P. 4). Agriculture and Food Canada (2001) observed that the exact definition of what constitutes e-readiness was still open for debate and pointed out that, there were many degrees of e-readiness and each could include any one or more than one of the following activities: using e-mail as the most preferred communication method; using a Web site for internal and external communication; selling goods and/or services using the Internet; making travel arrangements using online Internet services; finding and purchasing computer equipment, software supplies and services through a company Web site; and sending electronic invoices to customers and receiving electronic bills.

The impetus for e-readiness initiatives both in developed and developing world is occasioned by the fact that ICT promises enormous benefits as part of the solution to economic and social problems facing countries. Moreover, it is felt that developing countries in particular, face the threat of being left behind if they do not address the growing intra and inter-country digital divide. In addition, international leaders and lending agencies are increasingly requiring recipients of donor funds to integrate ICT into their development aid programmes (SADC E-readiness Task Force, 2002, p. v). By harnessing the potential of ICTs, in all areas of human life, national and local governments have realised that they can now provide new and better responses to vital long standing issues such as poverty reduction, wealth creation as well as education, equity and social justice (Consulting and Audit Canada, 2004, p. 1). Similarly, an understanding of the e-readiness of a country or community is essential for providing baseline information that can be used for planning and also for making comparisons across regions, countries, and organisations (Minton, 2003; Rizk, 2004).

## E-GOVERNANCE SYSTEMS IN EAST AFRICA



The three East African countries of Kenya, Uganda, and Tanzania under the umbrella of the East African Community (EAC) as already pointed out, have developed a vision that is expected to guide the region e-government development agenda (East Africa Community, 2005). The EAC e-government framework covers all major aspects of regional cooperation such as online public services; e-education for public administration and e-business and entrepreneurial support. Each of the countries is making progress within the framework of e-government strategy. Tanzania for example, finalised and published its national ICT policy in March 2003 and has so far implemented various e-government initiatives in the area of civil service reform. One notable e-government success story in Tanzania is the integrated financial management system (IFMS). IFMS provides online accounting and payment activities in key government offices throughout the country and one bank account for the whole government (Oyomno, 2004).

In contrast, Kenya published its e-governance strategy in March 2004. The strategy is meant to: help government talk to itself, enhance its interaction with the citizens, and improve government services to the business community (Nyanchama, 2004). The Kenyan e-government strategy when fully implemented will find application in policing, voting, traffic management and more. It is expected that e-government will address inefficiency in business registration process that is currently bureaucratic and consumes so much time that some investors choose to go elsewhere. The same can be said of the judicial system where files get misplaced and thus delays the execution of justice (Nyanchama, 2004). The progress in the implementation of e-government strategy in Kenya include Cabinet's approval; creation of a Cabinet Committee to oversee its implementation; establishment of Permanent Secretary-level Committees to deal with institutional implementation. In addition, awareness creation in government, and public service is going on. Furthermore, in June 2004, structured networking cabling were reported to have been completed inmost government buildings. Moreover, training for technical staff and user training for civil servants is ongoing and all government ministries have information Web sites (Okongo, 2005).

In Uganda, the Interagency E-Government National Planning Team embarked on strategies to integrate ICT into the revised poverty eradication action plan for 2005/06. Moreover, 54 portals and ICT training centres and cyber cafes have been set up in 30 districts across the country. Furthermore, computerised driving licenses is being implemented and some five universities have set

up e-learning facilities (Bitwayiki, 2005). To date, e-government progress that has been made include the completion of the first phase of a multimillion-dollar integrated financial management system (IFMS).

In Tanzania, the government is making good progress in its e-governance plans. The progress so far made in implementing e-government include endorsement by Cabinet on April 20, 2004 of the e-government strategy. Key features of approval according to Sawe (2005) was the establishment of official point to coalesce and reinforce existing e-government initiatives; build wide area network to carry voice and data efficiently among all levels of government. Moreover, management information system strategy has been successfully piloted in three ministries. In addition, recruitment of staff to strengthen e-government support and continued ICT awareness of over 2000 civil servants have also been undertaken.

## E-GOVERNANCE SYSTEMS IN SOUTHERN AFRICA

The SADC member countries were assessed in 2004 for e-government maturity based on UNDPEPA e-government readiness levels that has been discussed earlier. The UNDPEPA e-government ranking of countries is based on an index computed from variables such as Web sites, telecommunication infrastructure and human resources. On the basis of the assessment, Botswana, Malawi, Lesotho, and Angola were placed in the emerging category. On the other hand, Namibia, Mozambique, Tanzania, and Zimbabwe were placed at the enhanced stage, while Mauritius and South Africa were at the interactive stage. At the seamless stage, only South Africa was listed (UN, 2004). The actual index scores were as follows: Mauritius (0.5055), South Africa (0.4902), Seychelles (0.4259), Botswana (0.3827), Swaziland (0.3647), Namibia (0.3290), and Lesotho (0.3250). These e-government indices were above the African average of 0.2528 but below the global average of 0.413. A similar assessment based on percentage of e-government utilization put South Africa and Mauritius in the high range (67-100%), while the rest of the countries were in the low range (0-33%) (UN, 2004).

Each country within the SADC region is making its own e-government progress. In South Africa for example, the government is using information technology to enhance community development and democratic space as part of the public sector reform measures to enhance transparency and accountability in the management of public resources (Benjamin, 2001). Community telecentres have been established across all the nine provinces in the country to enhance access to government information by the communities (Heeks, 2002). The South African government in 2004 launched the Internet gateway, giving individuals, organisations, and foreigners a single entry point to government services and information, organised according to user needs rather than government structures. The gateway has the information portal which carries comprehensive, information on government contacts, departments, events and projects, as well the latest government speeches, statements, notices, tenders and consultative documents (SouthAfrica.info reporter, 2004). Other important e-government development in South Africa include the Home Affairs National Identification System (HANIS), which was approved by Cabinet in January 1996. This system along with associated advanced technology such as an automated fingerprint identification system (AFIS) and smart card technology, are expected to enhance civic services management (Department of Home Affairs, 2002).

Geness (2004) outlines other e-government projects in South Africa that were being rolled out in 2004, such as Cabinet project to enable the President to monitor and evaluate performance of Ministers; integration of the Criminal Justice system to enable the electronic tracking and monitoring of events from commission of a crime, arrest through the court process leading to conviction, rehabilitation and re-integration into society; conversion of fingerprints into digital format; putting matric results online, small and medium-scale enterprises name reservation; deeds registration; information enquiry service; cross border permit applications, tax e-filing; school networking and education related projects.

In Mozambique, the government has successfully implemented an e-government pilot project connecting 15 national public administration entities in Maputo the capital. The project is called Government Electronic Network (GovNet), and is part of Mozambique's national Information and Communications Technology Policy Implementation Strategy. The strategy aims at improving public services and increasing transparency in the public sector. To date, the pilot has established a communications platform for the Ministry of Public Administration, Ministry of Finance, Ministry of Health and Ministry of Science and Technology, giving them a unified e-mail system, intranet, and document management system, as well as cost-effective shared access to the Internet (ITWeb, South Africa, 2005). GovNet is being used by over 500 government employees. Oyomno (2004) lauds Mozambique's successful ICT policy and implementation strategy attributing this success to strong institutional arrangement such as the ICT Policy Commission, political leadership in which the Prime Minister chairs the Commission, and finally the top-town approach and simple but powerful framework of implementing the e-government program.

In Namibia, the ICT Alliance -a non-profit organisation comprising of all ICT related bodies including the government and the private sectors exists to narrow the digital divide in the country. The Alliance plans to run a project code-named Wise Namibia, with the vision to give Namibians equal access and skills to use and benefit from the information society services and communication systems. The intention is to create a wide client base for e-governance and e-commerce. The Namibian government was reported in 2005 to have finalized an e-governance policy for the public service for Cabinet approval (AllAfrica.com, 2005).

In Mauritius, the vision of e-governance is to create a digital community which can foster personal involvement in government; bring government closer to the people and provide round the clock service (Aubeelack, 2004). Institutional mechanisms that have so far been put in place include ICT Ministerial Committee chaired by the Prime Minister, and three Ministerial Task Forces on e-government, e-education; cyber city and business parks. Moreover, the necessary regulatory framework has been promulgated as well as the liberalization of Telecoms sector. Furthermore, a new licensing regime has been put in place and a national telecommunication policy was elaborated in 2003. There is an ongoing capacity building program for all and specific training for civil servants. In addition, improvement on existing ICT infrastructure has been undertaken. Moreover, an e-government task force was set up under the chairmanship of the minister of Information Technology & Telecommunications. Other e-government projects include the computerization of passports and immigration services; trade-net or the electronic authorization by customs for delivery of goods, electronic submission of sea manifest by shipping agents, electronic declaration and processing of bills of entry at customs and transfer of containers and contributions network project (covering revenue departments such as income tax and value added tax). Moreover, a government one-stop Web portal that provides comprehensive information and delivers integrated services round-the-clock has been completed

In Lesotho, progress that has so far been made in e-governance include access to a computer by each government office and the networking of ten ministries (Sehlabaka, 2004). In contrast, in Botswana, the government in 2005 completed a national ICT policy that provides the roadmap for bringing all government services online (Department of Information Technology, 2004). The policy now awaits Cabinet approval before it is taken to parliament for enactment. In contrast, in Zimbabwe, the government Web site is populated with the ruling party content (Anzinger, 2001), while in Namibia, the government Web site includes the Ministry of Health and Social Services, a gateway providing specialised information services on health (Republic of Namibia, Ministry of Health and Social Services, 2002).

## PROBLEMS OF IMPLEMENTING E-GOVERNMENT SYSTEMS IN EAST AND SOUTHERN AFRICA

There are various problems being experienced by the countries of East and Southern Africa in their endeavour to implement e-government projects. The problems are of human resources, infrastructure, financial, political, and cultural nature. In Kenya for example, Nyanchama (2004) points out that critical ICT skills are generally lacking. Where they exist, they are not sharpened enough to cope with the anticipated task of realizing the e-government strategy. The e-government strategy in Kenya faces further challenges of the government workforce that has been brought up in an era when computers were a mystery to many. Eldon (2005) enumerates problems facing Kenya with regard to e-government to include among others: lack of commitment by the top leadership, high cost of hardware and software, and poor basic telecommunication infrastructure. Moreover, Kenya's telecommunications sector suffers from under-investment and political interference. For example, the country has not formulated an integrated national informatics policies, lacks a national ICT policy, and the slow pace of liberalisation of the telecommunication sector is of great concern. Similarly, Tanzania faces infrastructure problems that must be addressed to achieve effective e-governance. For example, the number of fixed telephone lines were 230,000 in 2002 in a population of 35 million giving a teledensity of 1.2% (Sawe, 2004). In Lesotho, (Sehbalaka, 2004) notes that very few homes have access to computers or the Internet. In addition, the country faces the problems of lack of commitment from senior officials and shortage of IT skilled personnel. Similarly, in Botswana, most of internet connectivity is in government and the country faces the problems of lack of coordination of efforts and resources, lack of national ICT strategy, fast changing industry and the acceptance of ICT in a predominantly resources based economy (Department of Information Technology, 2004).

The problems affecting countries of East and Southern Africa in their endeavors to implement e-government systems have not spared South Africa either which is regarded to have a well advanced telecommunication infrastructure. For example, 45% of the population in South Africa live in rural areas with less developed infrastructure compared to the urban areas. Moreover, by June 2000, teledensity in the country was just over 5.5 million or 14 telephones per 100 people with an estimated number of over 16 million cell phones and 2.1 million dial-up users

of the Internet in a population of 45 million people. In addition, PC penetration was 6.2% of the population and human poverty index was 20% in 2004 (Geness, 2004).

The issue of freedom of information is likely to affect the operations of e-government systems in East and Southern Africa. Within the two region, only South Africa and Zimbabwe have FOI legislation. Kirkwood (2002) notes that freedom of information (FOI) is a necessary pre-condition for an effective and participative democratic society in which government is both transparent and accountable to its citizens. Moreover, allowing citizens to obtain information is essential for full democratic participation in society, and passing legislation on access to information opens a dialogue between the government and the people. Further, without full information, the citizen cannot criticize policy. Similarly, without a voice and the right to put forward views, the citizen cannot contribute to political and social change. Through freedom of information legislation, an open and accountable administration is promoted. Freedom of information gives the citizen the right to establish what government does and what basis is used to decision making.

## MISSING LINKS IN E-GOVERNMENT INITIATIVES IN EAST AND SOUTHERN AFRICA

Within e-government environments, large amounts of e-records are generated and equally utilized. However, despite the increasing adoption of e-government in East and Southern Africa, e-records are not being effectively managed to enhance transparency and accountability in government. E-records are the recorded information, documents or data that provide evidence of policies, transactions and activities carried out in e-government and e-commerce environments (International Records Management Trust, 2004). The increasing use of ICT especially the Internet in government operations in East and Southern Africa has given impetus to the generation of e-records, touted in the developed world as strategic assets vital to the functions of the state. Like traditional paper records, e-records support the day-to-day operations of government services and interactions with citizens, private and public sector partners. By and large, in developed regions such as North America and Europe (Open Text Corporation, 2003) where government services have increasingly moved online, it is claimed that e-records are becoming the basis for confirming pension and other entitlements; registering births and deaths; verifying citizenship, certifying voting rights; enabling collection of taxes, supporting financial management and supporting litigation (International Records Management Trust, 2004). Given the inextricable nexus between e-government and e-records, accountability and transparency issues are less likely to be achieved unless these twin issues are integrated within governance systems. Similarly, the issue of FOI cannot be ignored in the equation involving e-government and e-records management. In the absence of an effective FOI legislation, e-government and efficient e-records management systems alone will not be able to achieve optimal results. FOI will assist in obligating governments to make information in their custody available to citizenry through e-government infrastructure.

The countries of East and Southern African as they increasingly move to embrace e-governance to enhance transparency, accountability in the management of public resources, should also consider issues of e-records management and freedom of information access for them to reap maximum benefits.

## FUTURE TRENDS

Though there is increasing focus by governments in East and South Africa to implement e-government programmes, little effort is going into programmes to enhance the management of e-records that are the main product of e-government transactions. E-government as already pointed out is aimed at enhancing accountability and transparency in management of public affairs. However, in the absence of a strong and effective institutional framework for management of e-electronic records, there is less likelihood that the virtues of e-government will be realised. Future research in East and Southern Africa should therefore focus on the nexus between e-government and e-records management as well as FOI and how the three can be implemented in tandem in order to realise the desired impacts. Moreover, e-government and e-records management alone will not be sufficient in the absence of an effective freedom of information legislation to compel government to enable access to information in its custody that citizens should have access to subject to defined regulatory restrictions.

## CONCLUSION

E-government and e-records management are inextricably intertwined. The two issues currently are the focus of public sector reforms both in developed and developing world. Governments in East and Southern Africa need to undertake various policy decisions and actions to enhance e-government and e-records management. Among these decisions should be the incorporation of e-records management as a fundamental component of ICT and e-

government strategies. For this to be achieved, governments need to embrace innovative initiatives such as public sector reforms aimed at re-examining records management practices to ensure efficiency and productivity in the provision of government services to citizens. Furthermore, any e-government initiative should be viewed within the broader context of public sector reform agenda and must be accompanied by a thorough process reengineering, organisational redesign and skills development programme if it is to realise maximum value. Such e-government strategy should also incorporate records management policies, skills development, infrastructure issues, attitude change, and work practices. Similarly, employing competent and trained ICT staff will provide the basic platform on which to build successful e-government and e-records management strategies.

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## KEY TERMS

**Accountability:** Obligation of government, public services, or funding agencies to demonstrate to citizens that contracted work has been conducted in compliance with agreed rules and standards.

**East Africa:** The countries of Kenya, Uganda, and Tanzania under the umbrella of the East Africa Community (EAC).

**E-Government:** The use of ICTs to improve the delivery of government services and information, enhance efficiency and accountability of public administration and strengthen economic performance.

**E-Readiness:** The preparedness of a country or community to participate in the networked world.

**E-Records Management:** The application of records management principles in an electronic Environment.

**Freedom of Information (FOI):** Policy pertaining to the release of certain requested information to any member of the public regardless of the reason for the request subject to universally accepted restrictions.

**Good Governance:** The administration of government, public or private sector services that are efficient, fair, open, and impartial.

**Public Sector Reform:** The restructuring of public service for good governance and development. It is aimed at making services more efficient and responsive to the needs of the citizens.

**Southern Africa:** The countries of: Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe under the banner of the Southern African Development Community (SADC).

**Transparency:** A global standard for state institutions and international organizations, requiring openness in the management of public affairs.

# E-Government Regimes

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## INTRODUCTION

The internationalization of the reform movement is changing the ways in which governments operate throughout the world (Kettl, 2000). The ICT revolution is fast spreading its reach from private enterprises to bureaucratic agencies. As a result, electronic government (e-government) is both encouraging reform and, in itself, is a way of reinventing traditional structures and procedures and improving how the machinery of decision-making works. The scale of e-government developments is the subject of much research on a global perspective (Kamark, 2004). They show different and conflicting theoretical and ideological paradigms, but very little effort has been made to formulate a framework to define the e-government regimes that emerge in different political and institutional contexts. Since the characteristics of the World Wide Web (WWW) become the parameters from which to evaluate the public organizations and their capacity to innovating in regard to technology policy, the dominant vision of e-government emphasizes service delivery. As Forlano said (2004, p. 35) "the case studies ... bring to life common classification of e-government stages … ," not to a typology focused on political and institutional features. In this way, a crucial point is underestimated; namely, that the restructuring of the administrative apparatuses because of the WWW is a *political choice*, and does not take place in a institutional and ideological vacuum, which at the end of the day expresses its nature, whether democratic or otherwise (Barber, 1999).

## BACKGROUND

The strands of thought that have been used—and are still used—to understand and provide the normative guidelines for electronic government have tended to follow intellectual paradigms already well known in the social sciences.

First, e-government assumed the characteristics of a coming revolution. The information highway would enable the reformed logic of political and institutional power to cope with the expectations of citizens. Later, the coming revolution became the revolution betrayed. Few, if any, of the promises had been realized, and the suspicion was that from the very beginning, initiatives to achieve e-government were mystificatory: They merely fed into the democratic utopia while the web of electronic control by the administrative and executive power were extended. They were constructing a new *panopticon* (Campbell & Carlson, 2002).

Finally, a different paradigm was diffused, which makes little use of the evocative metaphors of apocalyptic scenarios: neither a revolution, nor a *panopticon*, nor a Big Brother. Instead, an evolutionary paradigm that follows the stages in the development of e-government (Layne & Lee, 2001; Schelin, 2003).

The widespread diffusion of the ideology of best practice sinks its roots into this cultural humus, suggesting that there are practices of electronic government which, once they have been adopted as a model, represent the ultimate aim of the processes of modernization of the administrative and institutional systems at the most diverse levels. That the map of best practices should also include experiences that come from non-Western countries that do not share the liberal-democratic ethos serves merely to isolate the technological and organizational component of the re-engineering strategies from the wider context of the relationships and political significance of e-government. In short, more attention is paid to the suffix "e" than to the effective use of information and communication technologies (ICTs) in redefining the delivery of public services, than to the term "government." Here, there is a strong temptation to refer interchangeably to e-government and online service delivery (West, 2004), obscuring the political meaning and transformational potential of e-government.

In contrast, we find a greater attention to the transformation of the state bureaucracy and apparatus, due to rising levels of Internet use by governments, the private sector and society in general, in studies that, far from the evolutionary perspective, consider alternative pathways that confront the advanced industrial countries.

E-government used here is defined as the use of ICTs as a tool to achieve better government. The impact of e-government at the broadest level is simply better government—e-government is more about government than about "e." The demands of Web-enabled government are analyzed in the context of the extensive changes in public-sector organizations that have characterised reform movements in the liberal democracies for more than 20 years (Dunleavy & Margetts, 2000).

Given the obviously central role that ICTs play in its creation, it would be easy to conclude that e-government is primarily a technical exercise rather than a collection of political and social choices involving special technical considerations. But, to realize its promised benefits of transformation and engagement, e-government must also be seen as being about *normative and political processes*, rather than just the act of automation itself (Riley, 2001).

The use of ICTs can encourage greater citizen engagement and can be a liberating and democratizing force within government, although ICTs can also be extremely effective instruments of control and authoritarianism. It is a function of the policy choices that governments are making with respect to how that technology is implemented and utilized, and of the political, social and economic context of a country (Rose, 2005).

## A TYPOLOGY OF E-GOVERNMENT REGIMES

To obtain a typology of different kinds of e-government regimes, we consider first the policies that define the architecture of the network. The nature of the code of cyberspace is a determinant factor in order to specify the processes and characteristics of different regimes of e-government. This code can be more or less open or closed. The selection of one or the other code prefigures a certain type of Net Architecture. Architecture is a kind of law: It determines what people can and cannot do in the real life as in the virtual one (Lessig, 1999).

Nevertheless, the code's effect will depend on the preexisting or current governance practices of a state at the global, national and local levels. Governance is not an abstract idea; it refers to the ways in which the different political levels, the diverse actions and practices inspired by various beliefs and traditions shape policies (Bevir, Rhodes, & Weller, 2003).

From the combination of those factors, four types of e-government regimes emerge, which are described below.

## REFORM-ORIENTED E-GOVERNMENT

Every e-government policy is reform-oriented, as they imply a top-down process, and the presence of a strong leadership seems to be one of the main conditions for the success of these policies (Lenihan, 2002; OECD, 2003). Nevertheless, the characteristics associated with this category are not universal, being linked with the experiences and practices of e-government in which the leadership and administrative and legislative networks that are subordinate to it, and favor a formally open network architecture that guarantees relevant democratic values and principles.

It is the original spirit of the ideology and action of Al Gore (1993-1997) that enabled the United States (U.S.) to enjoy a considerable cultural and technological advantage on the issue of e-government, to the extent that a transition has already occurred from a top-down approach centered on the characteristics of the techniques to be promoted to a bottom-up approach geared towards creating an environment favorable to this diffusion by involving all social actors, including citizens and businesses, in particular (Heeks, 1999).

Another example of reform-oriented e-government policies is the United Kingdom's (UK) experience at the end of the 1990s. The labor government's reform agenda has e-government at its heart, playing an instrumental role in joining up organizations to create citizen-focused public services. In the first e-government publication post-1997, *Our Information Age*, and in the *Modernising Government* white paper (1999), ICTs are a tool for both departmental reform and improvements in service delivery to reorientate it to the needs of citizenry (Organ, 2003). The government's strategy, which required massive coordination at the center, emphasized furthermore the political and institutional meaning of the technological innovations. When the UK *Citizen Online Democracy* (UKCOD) went online, Prime Minister Tony Blair observed that "The *Have Your Say* Web site is a historic opportunity for the public to play a meaningful part in the framing of new legislation … I support this initiative to help modernize and enhance British democracy in future as part of the legislative process." With cabinet office support, UKCOD had created a constitutional innovation which, if "Blair's hope is realized, will serve as a precedent for the future democratic governance" (Coleman, 1999, pp. 203-205).

This embraces in a definitive manner those e-government practices that reflect, at various levels—supranational, national and local—a strong political will to implement institutional change and to modernize administrative structures (Panagopoulos, 2004). The choice of an open architecture is not made to keep up to date, but rather to re-establish the system, even though it has not yet matured within it all of the resources and conditions necessary to achieve this objective.

In many cases, these initiatives demonstrate many limitations and ambiguities. Their capacity to enable citizens to participate effectively in decision-making processes is minimal, and the institutional mechanisms provided by the administrative apparatuses to receive and transmit demands from below—or rather, from the network—have revealed themselves to be weak or inadequate (Ward, Gibson & Lusoli, 2005).

## AUTHORITARIAN E-GOVERNMENT

New communication technologies have long been viewed as unequivocally on the side of political freedom, and not only in Western democracies. It seemed reasonable to believe that it would have a devastating impact on dictatorships.

In societies where the government holds all political power and is willing to crack down hard on any dissent, a mere connection to the outside world is not enough to force change. Many regimes may choose to forego the Internet's benefits to maintain political control (Kalathil & Boas, 2003).

The most important and interesting example is China, which has the world's third-largest number of Internet connections, after the U.S. and Japan. China, as Singapore, has promoted more widespread access to the Internet and has tried to limit the medium's potential challenges through a combination of content filtering, monitoring, deterrence and the promotion of self-censorship (Rodan, 1998).

The leadership has also developed a number of equally significant proactive strategies designed to use the Internet to strengthen the Chinese state (Tsui, 2003). Through both overt measures (such as e-government procedures and the design of a nationwide Intranet) and more subtle means (such as channelling online content towards support for the regime), the Chinese state has shown that it can use the Internet to enhance the implementation of its own agenda.

The first of these proactive strategies involves the computerization of government—an e-government plan designed to strengthen state processes by transforming the bureaucracy. The regime seeks to streamline many of its government operations through networked information management and to consolidate Beijing's central authority through more efficient communication with provincial governments. Although its ambitions for e-government far outstrip its achievements, a number of departments and bureaucracies have established home pages or placed databases and archives on the Web. While these actions are part of a genuine effort to increase transparency and address citizens' concerns with government processes, they also facilitate the state's goal of efficient intra-governmental communication.

The Chinese government has also employed top-down directives, harsh regulations and punitive measures to send a lesson to those who might be tempted to use the Internet for political organization or the dissemination of forbidden messages. This is a form of modernization from above, in which political control over the network and, therefore, the limitations on citizens' freedoms, play an essential role.

In the majority of cases that fall into this category, the e-government policies express a dual circuit of exercise and legitimation of power. This is a kind of "Dual State": the authoritarian one, based on tight control of cyberspace and, therefore, on the limitation of rights; and the modernizing one, which presents itself with the attributes of efficiency and a managerial outlook, and which used new technologies to rationalize the bureaucratic and administrative apparatuses to favor the economic and social growth of the country.

## MANAGERIAL E-GOVERNMENT

In the last few decades, private administration has became a model for running public bureaucracies. The drive for reinventing public government has heavily relied on the doctrine of the new managerialism for introducing the three Es—economy, efficiency and effectiveness—as the new guidelines for the public servant's behavior. As a result, the dominant trend in western democracies has become one of blurring boundaries between private and public administration. This is true in terms of organizational patterns as well as on normative grounds, where principles of economic efficiency are becoming the main legitimizing criterion for governmental policy-makers (Kettl, 2000).

Despite the fact that it is often surrounded by ambitious and persuasive rhetoric, this model is focused almost entirely upon utilizing technology to boost bottom-line performance in terms of achieving cost savings, often by reducing the level of staffing infrastructure associated with service maintenance and delivery.

Many governments are adopting and adapting the tools used by big e-commerce firms to understand how people use official Web sites. And the once unconditional support for e-government programs is being replaced by growing demand for a return on investments, that means a shift to the idea that innovations should be driven by considerations of value-for-money.

E-government programs typically bear a political agenda of government by the market, based on the assumption that market relations in the public sector are better at meeting people's needs than conventional forms of public administration. The practices of managerial e-government represent both challenges and opportunities, but within an incremental logic of development that does not alter the normative and ideological preconditions of public action in a market economy.

The attention appears to be concentrated on issues of efficiency, the reduction of costs, the development of e-commerce and other market-orientated needs. It is necessary to implement e-government, because in the information society, if one of the actors—the public sector, for example—remains tied to traditional forms of

communication and does not embrace the new technology, this creates an obstacle for the other actors as well.

The move towards managerial e-government practices has profound implications for the fundamental relationship between citizen and government. In fact, the gradual shift in the meaning of e-government emerges with particular clarity precisely from the way in which the notion of the citizen is conceptualized. The term citizen-centric is used to encompass not only the interests, needs, experiences and expectations of the private citizen as an end-user and contributor to the funding of public services, but also the views of other key stakeholders, including internal clients of public-sector organizations as well as other groups drawn from commercial and voluntary sectors. This approach thus emphasizes the effective changes that have occurred in the way in which the public sector organizes itself to do business (Milner, 1999). This suggestion was quickly taken up, as the most recent observations confirm (Accenture, 2003).

## OPEN E-GOVERNMENT

E-government policies as a source of new experiences of democratic participation, thanks to the transparency and openness of governmental processes, are still at initial stage, with some pioneer experiences, especially in Northern Europe at the regional and local level (Kersting & Baldersheim, 2004). Among the first experiments of e-democracy, including that of the city of Santa Monica's Public Electronic Network (PEN), the fundamental aim is to give more vitality to democracies using an interactive electronic network as channels for access to political information and participation in decision-making (Tsagarousianou, Tambini, & Bryan, 1998).

This is a committed aim endorsed by Erkki Liikanen, member of the European Commission and head of the Enterprise and Information Society section. At the conference on *Local eGovernment in the Information Society* held in March, 2003, in Barcellona, he said:

E-government should help to make democracy function better. This is about increasing democratic participation and involvement. … "Open government" also means increased transparency and accountability. … This means that e-government should provide equity; that is, equal rights and opportunity for participation for all. In other words, realizing inclusion. Equity matters for social justice. It is about what we consider to be fair and just in our society … (from http://europa.eu.int/comm/press_room/index.htm).

Compared to the early 1990s, there is greater awareness of the centrality of policies for the structuring of network environments as a premise for e-government and e-democracy policies. This awareness has emerged in relation to the use of open-source software within the public administration (Ghosh et al., 2002).

However, open-source software is not solely about code and software. The movement's ability to organize itself around democratic ideals and develop a product in a joint learning experience is an invaluable source of inspiration for the whole society. In this respect, the open-source movement is not a traditional representative democracy, either. The democratic values are constituted of the principles that everyone can get insight, everyone can give their contribution and everyone can change the result of decisions (by adjusting the code). It represents a civil society that is self-organized as a form of pragmatic technocracy, built on the same democratic values that created the Internet and with an open result. New practices and traditions can evolve to ensure that democracy does not stagnate. The values and commitments espoused by these groups are democratic, and can be seen as a counter to some of the very undemocratic values associated with the prevaling neoliberal order (Dahlgren, 2005).

Even if the consequences of experiments to formally incorporate the Internet into the political system have not been overwhelming, open government is a combination of institutional practices and cultural ethos relevant to contemporary democracies, where the architecture of the network, in adapting itself to various contexts, configures itself in a way that safeguards the fundamental entitlements of individuals, encourages ballot participation (*e-vote*) and contributes to the processes of drafting and implementing policies (*e-rulemaking* and *e-legislature*).

## FUTURE TRENDS

E-government practices demonstrate that the democratic potential of the Internet has been marginalized as a result of the ways in which the use of such technology has been framed by governments—national, supranational and local. The managerial model of interaction, founded in many cases on the emulation of private sector management practices, has assumed dominance at the expense of other possibilities. E-government programs are more and more customer-centric, and exibit greater maturity in their business services than in their citizen services (Chadwick, 2003).

This trend is further reinforced according to recent data, as well "a new decided efforts to integrate vertically—across national, state/regional and local level of government" (Accenture, 2004, p. 4). The managerial model is re-shaped to that of a corporate type. This development has become extremely important, above all,

in the aftermath of the events of September 11, 2001. Many countries have adopted laws, measures and actions poised to place the Internet under the tutelage of security services (Lyon, 2003).

The technology to achieve this is being incorporated into the Internet's infrastructure, into its architecture. In this sense, the architecture of the network expresses the interpenetration of two different logics: the corporate (since its structure is based on software standards produced by business policies) and the political, which intends to control the Internet.

Thus, as recent developments are pushing e-government practices in many democratic systems towards a critical threshold, it would not appear that the Internet is seriously threatening the authoritarian e-government regimes. Some suggest that because the medium allows unprecedented access to multiple sources of images, news and ideas, it can challenge state hegemony over the distribution of information and ideologies. Certainly, in some cases, as in China, the government has lost much control over the information and images that now circulate through Chinese society. Both the new political leaders and China's private enterpreneurs and technical elites, however, have shown little interest in promoting democratization. The political leaders think they can solve China's problems, above all, stay in power and direct China's modernization and integration with the global economy (Natham, 2003).

In this scenario, characterized by the combination of political control and corporate logics, the open e-government experiences are far from straightforward but, nevertheless, achievable in e-democracy implementation at a local level in four principal areas: online consultations integrating civil societal groups with bureaucracies and legislatures; internal democratization of the public sector itself; involvement of users in the design and delivery of public services; and diffusion of open-source collaboration in public organizations (Chadwick, 2003; Coleman, Macintosh, & Lalljee, 2005).

## CONCLUSION

Research on e-government bears little trace of contributions that show how cyberspace can be shaped into a wide variety of architectural configurations, with the result that the choice we now face is one about the kind of architecture that cyberspace should have. This tends to encourage a lack of attention for a technological domain that structures and regulates the relationship between individuals and political authority.

The prevailing concern with the transformation of Western political systems, or those that can be assimilated to Western models of organization of political power and the state, does not facilitate understanding of the above perspective. Variations, when they are identified, are in actual fact, treated as fluctuations within a single family, rather than differences that can give rise to distinct types of regime.

Moreover, precisely because the Internet is a global phenomenon, these distinctions are essential, and they also recover the dimension of comparative analysis in relation to the understanding of electronic government that the logic of cyberspace appears to erode.

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## KEY TERMS

**Constituent Policies:** It regards all state policies that establish structures and rules for the game, and attributes spheres of authority within whose confines future government policies can be created.

**E-Legislature:** It refers to how political institutions—parliaments and parties—have been making use of ICT as evidence by developmental characteristics for their Web sites. There are four distinct (but possibly correlated) dimensions for describing such use: (1) information, (2) bilateral interactivity, (3) multilateral interactivity, and (4) user friendliness.

**E-Rulemaking:** It refers to how ICT is changing the dynamics of the rulemaking process; above all, the potential or likely effects of information processing on the bureaucracy.

**Filtering Technologies:** Software systems able to scan Web pages, blocking vision of them if they contain elements belonging to a blacklist created before.

**Freenet:** Free software that lets you publish and obtain information on the Internet without fear of censorship. To achieve this freedom, the network is entirely decentralized and publishers and consumers of information are anonymous. Without anonymity, there can never be true freedom of speech; and without decentralization, the network would be vulnerable to attack. Communications by Freenet nodes are encrypted and routed through other nodes to make it extremely difficult to determine who is requesting the information and what its content is. Users contribute to the network by giving bandwidth and a portion of their hard drive (called the "data store") for storing files. Unlike other peer-to-peer file-sharing networks, Freenet does not let the user control what is stored in the data store. Instead, files are kept or deleted depending on how popular they are, with the least popular being discarded to make way for newer or more popular content. Files in the data store are encrypted to reduce the likelihood of prosecution by persons wishing to censor Freenet content.

**Free Software:** According to the Free Software Foundation (FSF) definition: "Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software: (1) The freedom to run the program, for any purpose; (2) The freedom to study how the program works and adapt it to your needs. Access to the source code is a precondition for this; (3) The freedom to redistribute copies so you can help your neighbor; (4) The freedom to improve the program, and release your improvements to the public, so that the whole community benefits. Access to the source code is a precondition for this. A program is free software if users have all of these freedoms" (FSF, 2006).

**Governmental Openness:** It is a measure of governmental response to citizens' demands for information and services from government organizations.

**Net Architecture:** The way a network (with its software and hardware components) is designed to work, enabling or not such actions to the administrator as to the final user.

**OpenGov:** It is an open-source e-democracy software platform designed as a scalable and free avenue for open and participatory government and bottom-up decision making in other organizations. It is a project of the MIT School of Architecture and Planning (see http://ecitizen.mit.edu).

**Open-Source Software:** The Open-Source Initiative (OSI) defines Open Source as software providing the following rights and obligations: (1) No royalty or other fee imposed upon redistribution; (2) Availability of the source code; (3) Right to create modifications and derivative works; (4) May require modified versions to be distributed as the original version plus patches; (5) No discrimination against persons or groups; (6) No discrimination against fields of endeavor; (7) All rights granted must flow through to/with redistributed versions; (8) The license applies to the program as a whole and each of its components; (9) The license must not restrict other software, thus permitting the distribution of open-source and closed-source software together.

# E-Government Strategies for Poverty Reduction in Africa

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## STRATEGIES FOR E-GOVERNANCE IN AFRICA

The United Nations Economic Commission for Africa (ECA) launched the African Information Society Initiative (AISI) in May 1996, which serves as a guiding framework for building the information and communication infrastructure in Africa. Since the launch of AISI, ECA has been supporting member states to embark on the development of National Information and Communication Infrastructure (NICI) policies, plans and strategies, which are instrumental to materialize the visions enshrined in the AISI at the national level and to create an environment conducive for information and communication technology (ICT)-led development initiative. Thus far, more than 30 countries in the continent have embarked, in one form or the other, on the development of national ICT strategies, and more countries have expressed interests to initiate national ICT policies.

One specific element of the NICI process is to realign the country's development goals, more precisely the Poverty Reduction Strategy Paper (PRSP) objectives, with the emerging ICT Policy. It is not an easy task, as traditionally the decision makers see ICT as a completely separate domain and often fail to see the role of ICT as a tool to attain the PRSP goals. Therefore, The Gambia NICI process was deliberately geared towards centering ICT policies and plans on the country's declared PRSP elements. The NICI policy that was developed consciously mapped the route to underlay the ICT tools that will help the country reach its PRSP destination swiftly, efficiently and more responsibly to the people.

This article illustrates an e-government strategy built on the objectives of poverty reduction as illustrated by a case study of The Gambia e-government strategy and NICI policy. The process and its evolved mechanism might serve as a model for e-government strategy and policy developers, planners and all stakeholders in general working in the area of digital governance.

## NICI PROCESS: A CASE STUDY OF THE GAMBIA

The NICI process in The Gambia, as indicated above, is geared towards recognizing the areas where ICT would contribute to attaining the overall objectives of the four strategic issues identified in the PRSP besides other priority areas (called "Pillars") of NICI:

1. Enhancing the productive capacity of the poor.
2. Enhancing access to and the performance of social services.
3. Local-level capacity building.
4. Promoting participatory communication processes.

A captious analysis of the prevailing socio-economic condition in The Gambia further highlights the challenges faced by the country in attaining those visionary goals. The e-readiness baseline survey conducted by the National Technical Committee for eGovernment (NATCOM) in July 2003 with technical assistance from ECA was used to map the prevailing status of the country in terms of ICT infrastructure and plans.

During consultative meetings with various stakeholders from all sectors of the society—government, private and the civil society—efforts were made to further pinpoint vital developmental issues concerning poverty alleviation at the grassroots level that a comprehensive NICI policy for the country should address. The consultations were used to highlight and espouse the role of ICT not as an end itself but as a means to achieve the PRSP goals. These consultations led to the shaping of a vision statement that underlines the link between poverty reduction strategy and ICT policy:

*To leverage the benefits of ICT for a people-centered, free market-based and export-oriented socio-economic development strategy built on principles of public-private partnership for wealth creation.*

In other words, the NICI policy was aimed at supporting the strategic objectives of the PRSP:

*To achieve higher growth rates in all spheres of socio-economic activities using ICT as a platform to exchange data, information, knowledge and a tool to implement applications and provide services in order to 'leapfrog' several stages of development through a participatory approach in building human resources and a conducive environment.*

The PRSP priorities in The Gambia are focused on "attaining a high level of economic growth with a special focus on the critical areas of private sector development, agriculture, natural resources, tourism, trade, industry (SPA II, 2000), and a timely attainment of the Millennium Development Goals (MDG)." According to the September 2001 report of the World Bank (World Bank, 2001) on attainment of these objectives, The Gambia is on track toward the attainment of universal primary education by 2015, moderately off-track towards halving the 1990 illiteracy rates by 2005 and on track towards gender equity in primary and secondary education. The Gambia was the only country listed as being on track towards reducing infant and child mortality rates by two-thirds by the year 2015, and is also reported as being on track towards attainment of the target on access to clean drinkable water.

Therefore, the first phase of the extensive consultations under NICI Process boiled down to four critical poverty alleviation goals, addressed under the SPA-II for The Gambia as follows:

1. Enhancing the Productive Capacity of the Poor.
   - 1.1 Promoting labor-saving devices for women.
   - 1.2 Providing access to credit.
   - 1.3 Reorganizing agricultural research and development (R&D) to encourage labor-intensive agriculture and development of small ruminants.
2. Enhancing Access to and the Performance of Social Services.
   - 1.1 Expanding access to basic social services in rural areas.
   - 1.2 Delivering responsive social programs to the poor.
   - 1.3 Enhancing sustainability and quality of social services.
3. Local-Level Capacity Building.
   - 1.1 Political and legislative framework for decentralization.
   - 1.2 Empowerment of local government authorities to assume decentralized responsibilities.
4. Promoting Participatory Communications Processes.
   - 1.1 Enhancing participation beyond consultation.
   - 1.2 Addressing gender at national and local levels.
   - 1.3 Institutionalizing dialog between government, civil society, and donors.

## POVERTY REDUCTION STRATEGY IN THE GAMBIA

The Gambia is among the poorest countries in the world. It was ranked 155 (out of 177) in the UNDP Human Development Index (UNDP, 2005). A series of exogenous shocks in the 1970s and 1980s, coupled with inappropriate policies, led to a decline in average GDP growth from 7.25% during the '70s to 3.25% during the late 1980s. The narrow resource base is a major inhibiting factor to economic resilience, aggravated by a high population growth rate.

Positive results in terms of stabilization under the economic reform program and its successor program (PSD) could not be sustained as the economy suffered adverse shocks, including the coup of 1994, which adversely affected tourism and aid inflows, devaluation of the CFA franc (Communauté Financière Africaine/African Financial Community franc) and declining world market prices for the primary export crop, groundnut. Consequently, real GDP growth declined from 5% in 1992 to about 1.7% during 1993-1996. Since 1998, the pursuit of prudent macro-economic policies and implementation of broad-based structural reforms have, together with favorable climate conditions, resulted in an improvement of the economic environment and laid the foundations for a sustained recovery. Real GDP growth increased to 5.3% between 1998 and 2001, and offers hope in the renewed effort to reduce poverty. The emerging situation presents an opportunity to investigate ways in which government can consolidate the achievements of successive stabilization programs and embark on pro-poor growth.

The outlook for economic performance in The Gambia remains gloomy, as the crop failure in 2002 and the rise in inflation are likely to have increased the level of poverty. Implementation of the PRSP has been weak due to limited capacity, absence of donor support and inadequate prioritization by the government (IMF, 2004). The government has committed itself to address these issues during the preparation of the 2005 budget.

On the brighter side, real GDP is estimated to have grown by 7% in 2003, largely on account of a recovery in agricultural output following the crop failure in 2002. The external current account deficit is estimated to have improved, and inflation as measured by 12-month changes in the official consumer price index (CPI) was 18% at the end of 2003. There are no reliable data yet for 2004 on real activity or the external account. The CPI inflation rate, however, declined from 18% in January to 16% in April, 2004. The overall fiscal deficit remained unchanged from 2002 at 4.5% of GDP in 2003.

Against this backdrop of structural and stabilization, reforms implemented so far focus on creating an enabling environment for private-sector activities, which include

the establishment of The Gambia Investment Promotion and Free Trade Zone, Gambia Public Procurement Agency and National Tourism Authority. Other key reforms are recognized in several other sectors for increased economic performance, with programs that support national governance and poverty-reduction programs. The major macroeconomic policies of the government includes:

a. Maintain real GDP growth of about 7% for the year 2004
b. Limit average annual inflation to 14.5%
c. Contain the external current account deficit (excluding official transfer) to about 14.5% of GDP
d. Replenish gross international reserves to about 5 months of imports of goods and services.

## LINKING DEVELOPMENT INTENT TO DIGITAL GOVERNANCE

The paradigm shift in the poverty-reduction initiatives in the recent decades has "gradually replaced the prescriptive, mainly donor-driven structural adjustment programs (SAP) of the seventies and eighties." A new vision of development cooperation based on "… partnership, ownership, country leadership, broad-based participation, development effectiveness and accountability" is a welcome change for highly indebted poor countries such as The Gambia (SPA-II, 2002).

Though the beneficial impacts of ICT in the overall development of a country is hardly questioned, incorporating the ICT tools in the "transformational" process, developing economies into the emerging information society is a delicate scenario (UNITF, 2003). While the link between ICT initiatives and socio-economic development results are to still to be thoroughly researched, the controversy continues to surround ICT interventions in development programs doubting these efforts being "techno-quick fix" or "unacceptable tradeoffs" in terms of investments (UNITF, 2003).

Socio-economic development of any society engulfs a much wider area today. Beyond money matters, it touches more humane aspects of people's lives, like standards of living. To cover this dimension of development, our initiatives should offer multiple opportunities to achieve economic prosperity as well as to improve quality of life. In other words, the issue here is whether we are following an agenda for "ICT development" as sectoral growth only or as a comprehensive strategy with an ultimate poverty alleviation goal. More precisely, under our PRSP activities, are we ready to sustain ICT-led initiatives with in-country human resources, budgetary allocations and supporting regulatory environment as an integral tool for poverty reduction?

The development of an e-government strategy for The Gambia, therefore, provided an opportunity to deliberate on the goals of the country's development efforts, specifically those aimed at poverty reduction as well as the use of ICT tools in increasing efficiency and transparency of its administrative structures, institutions and functioning. This collective reflection led to a road map from poverty alleviation objectives to the delivery of services at the doorsteps of the poor.

## ILLUSTRATING THE PRSP-BASED ICT POLICY

The NICI policy of The Gambia contains a number of items that covers the PRSP objectives and tries to support those goals through ICT-led plans of action. However, it is observed that a number of social, cultural, religious or other factors positively or negatively affect the adoption and diffusion of ICT. For instance, certain cultural or religious practices may prevent women from leveraging the benefits of ICT as compared to their male counterparts. Therefore, potential linkages between different areas of the economy focusing on cross-sectoral issues will help us forestall potential problems in this regard. The following table illustrates some of the major initiatives proposed for the next 5 years and how they respond to PRSP goals (Table 1). This is a tentative list as emerged from country-wide consultations with stakeholders and from a presentation made by participants at a National Workshop in Banjul the end of 2004. Many other activities and action items were included in the final NICI policy and plan that was validated by a national meeting of stakeholders in April, 2005.

Further, as discussed earlier, the MDGs and their timely attainment constituted a benchmark for the development initiatives in The Gambia. While developing the NICI policy and plans, the goals for the sustainable human development were taken care of by mainstreaming ICT-led action plans against each of the MDG goals. Poverty reduction is at the root of the human development efforts, and this has been incorporated in the NICI policy and plans through attending the PRSP objectives (Table 1). The other MDGs, like universal primary education, have been seen as a "social interaction" dimension of development and, as such, ICT are intended to be used as a tool for more efficient and cost-effective channels of teacher training, especially through Open and Distance Learning (ODL) mode, multimedia instructions as well as for educational planning and administration (e.g., Education Management Information System). The prevalent bias in educational opportunities towards the urban and male population in Africa can well be minimized through

*Table 1. Poverty reduction—ICT policy/e-government linkages*

| PRSP Objective | NICI Policy & Plans |
|---|---|
| **1. Enhancing the Productive Capacity of the Poor** | |
| a. Promoting labor-saving devices for women. | Rural Multimedia Centres for Women |
| b. Providing access to credit. | Credit / Loan Opportunities Information online |
| c. Re-organizing agricultural R&D to encourage labor-intensive agriculture and development of small ruminants. | Agricultural Information Systems for rural community information centres |
| **Enhancing Access to and the Performance of Social Services** | |
| a. Expanding access to basic social services in rural areas. | Launching e-government initiatives/ providing access at local area councils |
| b. Delivering responsive social programs to the poor. | |
| c. Enhancing sustainability and quality of social services. | |
| **Local-Level Capacity Building** | |
| a. A political and legislative framework for decentralization. | Local government leadership training for local government representatives |
| b. Empowerment of local government authorities to assume decentralized responsibilities. | |
| **Promoting Participatory Communications Processes** | |
| a. Enhancing participation beyond consultation. | Planning Feedback / Local Govt Representative Links up to the National Assembly level |
| b. Addressing gender at national and local levels. | Women Bureau's Rural Multimedia Centres as the participatory hub/link to the national development processes/programs. |
| c. Institutionalizing dialog between government, civil society and donors. | NGO/CSO links through NGO associations (e.g., TAGNO, Action Aid in The Gambia) |

judicious use of appropriate ICT tools for delivery of knowledge and information at the doorsteps of the rural and marginalized sections (women/youth) of society. That brings us to another prime MDG: gender equality and empowerment of women. The most prominent obstacle to women's access to knowledge and information leading to the limited opportunities for their economic upliftment is their restricted mobility. With access to ICT facilities, women can overcome both physical and socio-cultural distance and increase their capacity for income generation. The recently opened Rural Multimedia Centers for Women in The Gambia under the auspices of the Women's Bureau is an early fruit of the NICI plan. More such centers are going to rise in the near future. Social-service delivery aspects of the national e-government strategy also addresses other MDGs, focusing on reducing child mortality; improving maternal health; and combating HIV/AIDS, malaria and other diseases.

## FUTURE TRENDS

In developing ICT policies and e-government strategies for poverty reduction, an "ACTION" model may be followed through as six phases in the NICI process:

- *A*nalysis
- *C*onsultation
- *T*argets/Pillars
- *I*ntegration
- *O*rganization
- *N*ational Commitment.

In this process, the MDG should be focused as the common ground between the NICI and PRSP processes. Success stories from various parts of Africa, like the Virtual Extension Research and Communication Network (VERCON); Rural Radio; Farmers Information Network (FarmNET); and Information Management Resource Kit (IMARK), should be scaled up.

As content is the key for information and communication, the pro-poor ICT initiatives should attend to the increase in youth and adult literacy in a long-term approach to poverty reduction through ICT tools. In providing a channel of communication between public and the government, ICT facilities should be available to the marginalized to carry crucial feedback to the poverty-reduction initiatives for further review and planning of the PRSP. Traditional ICT tools, like community radio broadcasts, can be used to empower rural women with opportunities to opt for innovative and small entrepreneurial solutions in villages.

Geo-information systems should be used in poverty mapping and planning interventions, as geo-information helps identify, based on calligraphic representations, what needs to be done and how to plan such programs. Online resources for entrepreneurs should be supported in a regional basis and more local specific sites in this line should be initiated. ICT is traditionally seen as a separate sector or department, putting it apart from other sectors like agriculture or education. To attend to the poverty-reduction need of the region, the cross-cutting nature of ICT as a tool for development should be recognized with both fund allocation from national budgets and a participatory multi-sectoral approach in program implementation.

## CONCLUSION

To sum, poverty alleviation strategies all over the world focus on the basic humane issue of improving the quality of people's lives. In pursuing this prime objective, many a time we create a straightjacket agenda, narrowing our vision to a few sectoral and specific goals. NICI policies and plans, as envisaged under the AISI framework, seek to broaden that view, integrating the country's PRSP to the NICI policies and plans and sew all cross-sectoral issues in an ICT thread to support the poverty-reduction strategies in a more efficient and responsive way. In all these ICT-led action plans, what the NICI policy aims to achieve is not the development of the ICT sector itself (though it may form a sectoral agenda itself), but the socio-economic development of the people through pragmatic use of ICT. To conclude with the words of Dr. Ben Ngubane, the Minister for the Arts, Culture, Science & Technology of South Africa:

*The impact of Information and Communications Technology (ICT) on development has been amply charted in the last decade of the outgoing century as a multi-dimensional, multi-stakeholder and pervasive process. So significant is this impact that those that have the capacity to apply these technologies have witnessed rates of development that continue to fuel the Digital Divide.* (COMNET-IT, 2001)

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## KEY TERMS

**African Information Society Initiative (AISI):** An action framework launched by the UN Economic Commission for Africa. It has been the basis for information and communication activities in Africa for the last 6 to 7 years. AISI is not about technology; it is about giving Africans the means to improve the quality of their lives and fight against poverty. See www.uneca.org/aisi.

**Economic Growth:** Economic growth reflects the increase in the production of goods and services over time, and is often used as a measure of increased material well-being generated through economic activity. Economic growth is driven by greater use of inputs (such as labor, capital and natural resources) and/or growth in productivity. It is usually reported as a percentage increase in Gross Domestic Product (GDP) for a country or Gross State Product (GSP) for a state.

**Education Management Information System (EMIS):** An information system is the basis of management, planning and evaluation of an education system. The objective of an EMIS is not only to collect, store and process information, but also to help in education policy-making by providing relevant and accessible information. EMIS was originally designed to be a management tool, but is gradually being perceived as an indispensable tool and support system for the formulation of education policies, their management and their evaluation.

**E-Government/E-Governance:** While e-government is defined as a system of government services and information delivery to the public using electronic means, e-governance allows direct participation of constituents in government activities. E-governance is not just about government web sites and e-mail or service delivery over the Internet. It is not just about digital access to government information or electronic payments. *It will change how citizens relate to governments as much as it changes how citizens relate to each other.* It will bring forth new concepts of citizenship, both in terms of needs and responsibilities. E-governance will allow citizens to communicate with government and participate in the governments' policy-making, and will allow citizens to communicate each other. E-governance will truly allow citizens to participate in the government decision-making process and reflect their true needs and welfare by utilizing e-government as a tool.

**Geo-Information:** Geographic information or geo-information provides the common language and reference system to establish linkages and balance between economic, environmental and social capital to improve upon the basis for societal response. Access to spatial data and the policies governing that access are crucial in shaping policies, programs and projects. Geo-information forms an essential part of the knowledge available in modern information and communications science. It is required at all levels of administration, the economy and science, and by the public at large. It is the basis for planning in numerous fields. It helps governments and communities plan for homeland security, ensure critical infrastructure, protect the environment and deal with public health and safety issues as well as day-to-day resource management decision-making.

**Gross Domestic Product (GDP):** The most comprehensive single measure of aggregate economic output. It represents the market value of the total output of the goods and services produced by a nation's economy, and the value of all final goods and services produced in a country in 1 year. GDP can be measured by adding up all of an economy's incomes (wages, interest, profits) or expenditures (consumption, investment, government purchases and net exports)—exports minus imports.

**Information and Communication Technologies (ICT):** The term ICT is used to describe a range of technologies for gathering, storing, retrieving, processing, analyzing and transmitting information. Advances in ICT have progressively reduced the costs of managing information, enabling individuals and organizations to undertake information-related tasks much more efficiently, and to introduce innovations in products, processes and organizational structures.

**Information Management Resource Kit (IMARK):** Effective information management is increasingly critical in the digital era, involving a range of issues covering

standards, smart working practices and software. FAO has initiated a partnership-based e-learning program known as IMARK, which trains individuals in the effective management of agricultural information. See www.fao.org/imark.

**Information Society:** There is currently no universally accepted concept of what exactly can be termed information society. Most theoreticans agree that we see a transformation that started somewhere between the 1970s and today and is changing the way societies work fundamentally. Broadly speaking, it refers to a society where the creation, distribution and manipulation of information is the main activity. It can be used in relation to an organization bringing together people, ideas and issues involving information.

**Knowledge Economy:** Knowledge economy is based on the production, distribution and use of knowledge as the main driver of growth, wealth creation and employment across all industries. It does not rely solely on a few high-technology industries for growth and wealth production, but also on the application of knowledge in traditional industries, such as mining

**Millennium Development Goals (MDG):** The eight MDGs were agreed at the United Nations Millennium Summit in September 2000, and nearly 190 countries have subsequently signed up to them. The goals range from halving global poverty and hunger to protecting the environment, improving health and sanitation and tackling illiteracy and discrimination against women. Alongside the goals, a series of 18 targets were also drawn up to give the international community a number of tangible improvements to aim for within a fixed period of time, and also make it easier for them to measure their progress to date. The intention is that almost all of these targets will be achieved by 2015. Unfortunately, although improvements have been made in many areas in sub-Saharan Africa, for example, the number of people living in poverty there is still greater now than it was in 1990. See www.un.org/millenniumgoals/.

**NICI Process:** The whole exercise of national consultations in various phases and subsequent deliberations at various stages and platforms leading to the drafting, validation and adoption of a country's NICI policy, plans and strategy. In The Gambia, the process started in May 2004 and, after a series of consultations with stakeholders and workshops, the draft NICI policy is now due for validation and adoption in February 2005.

**National Information and Communication Infrastructure (NICI):** NICI includes physical infrastructure and the equipment used to host, process, transmit or display data, text, voice and images and also relates to regulations, enabling environment and procedures. NICI also encompasses development of human resources in the public, private and civil society sectors engaged in building infrastructure; creating applications and value-added services; carrying out training programs and training users; acquiring and selling equipment; as well as providing Internet and other ICT services.

**Open and Distance Learning (ODL):** ODL is learning where there is some flexibility and control in the hands of the learner as to when, where and how he or she will learn, balanced by structure and support from a provider. ODL includes any provision in which a significant element of the management of the provision is at the discretion of the learner, supported and facilitated by the provider. This ranges from traditional correspondence courses, online provision and interactive CD-ROMs to open learning centers and face-to-face provision where a significant element of flexibility, self-study and learning support is integral to the provision.

**Poverty Reduction Strategy Papers (PRSP):** PRSP are prepared by member countries in broad consultation with stakeholders and development partners, including the staffs of the World Bank and the IMF. Updated every 3 years with annual progress reports, they describe the country's macroeconomic, structural and social policies in support of growth and poverty reduction, as well as associated external financing needs and major sources of financing.

**Rural Radio:** Recognizing that the current world food situation poses one of the worst crises facing humankind, FAO has, since the 1960s, recognized the crucial role radio can play in helping to redress this crisis, as well as bring about rural development and poverty reduction. The organization has been associated with attempts at finding ways of maximizing its use and impact. The basis of this work has been an understanding of the nature of rural radio itself and its suitability for food security and sustainable development. See www.fao.org/sd/ruralradio/en/index.html.

**Virtual Extension and Research Communication Network (VERCON):** VERCON aims to harness the potential of the Internet and apply it to strengthening and enabling linkages among the research and extension components of the national agricultural knowledge and information system. The overall goal of VERCON is to improve, through strengthened research-extension linkages, the agricultural advisory services provided to Egyptian farmers and, in particular, to resource poor farmers to increase production in food and agriculture with the goal of raising farm incomes. See www.vercon.sci.eg.

# E-Government, Service Transformation, and Procurement Reform in Canada

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## INTRODUCTION[1]

New organizational arrangements are required to underpin emerging public sector service transformation initiatives with a substantial electronic government (e-government) dimension. These arrangements are both internal to government, involving new collaborative relationships among service delivery agencies and reform of procurement processes, and external, involving the formation and management of strategic relationships between private sector information technology (IT) vendors and public service providers.

This article explores the relational context of service transformation by first examining some current initiatives in Canada—at both provincial and federal levels. These case studies reveal the nexus between digital technologies, internal organizational change, and public–private sector interactions. They also reveal the emergence of new collaborative mechanisms between both sectors, especially in the initial phase of relationships where the IT-enabled service transformation is being mutually defined.

This heightened level of collaboration also represents a significant departure from traditional government procurement models—where inputs are defined by public authorities and then secured in the marketplace from qualified vendors. E-government—and service transformation initiatives in particular—are consequently driving a rethinking of the role and purpose of procurement mechanisms in an increasingly digital and interdependent environment.

Many political and administrative quandaries remain, however, as governments struggle to achieve a balance between traditional public interest principles such as probity, transparency, and accountability, and the rising importance of strategic collaboration. Building on the case studies and a review of current efforts at procurement reform, this article offers and assessment of how this interrelationship between service transformation and public–private collaboration is likely to shape future e-government-based service transformation efforts in Canada.

## SERVICE TRANSFORMATION AND COLLABORATION

As more citizens have flocked to the Internet for online services in areas such as banking and retail shopping, governments have begun to identify parallel opportunities for the application of online services in the public sector. Initially, the impetus for utilizing online channels to deliver information and services was couched in terms of financial savings: many business models were developed by government officials and consultants demonstrating the savings accorded to online methods of service delivery versus more traditional channels such as face-to-face facilities or telephone call centres.

Most of these initial models proved to be wildly optimistic due to forecasts predicated on massive transaction cost savings from Internet communication (relative to paper and telephone) or strong, short-term growth in demand for online services, relative to other channels (Roy, 2003). Nonetheless, new organizational and technological models for delivering services both online and via more traditional channels are taking hold—and beginning to generate encouraging results.

One of the most widely recognized examples of a unique service transformation involving the internal integration of government services and the establishment of a public-private partnership is that of Service New Brunswick (SNB). SNB is a crown corporation of the provincial government that has a dual role: to provide the people and business owners of New Brunswick with the greatest ease and access to government services, and to maintain authoritative public information through its three registries (real and personal property and corporate affairs).

SNB has been aggressively making use of its autonomy as a crown corporation (in comparison to a tradi-

tional line department) to forge collaborative relationships with industry. Central to its citizen-centric mission is the formation of "gBiz" in partnership with CGI (a Canadian technology solutions provider), a comprehensive and integrated framework for transactional service delivery. The company and the government shared in the financing of the development of this system, much as it is now sharing the revenues from licensing arrangements between CGI and other governments in Canada and elsewhere.[2] SNB now conducts more than 40% of its transactional business online and it is expanding into a variety of other collaborative projects with companies designed to jointly develop solutions for New Brunswick that can be marketed and sold elsewhere.

One notable model in the United States is New York City's NYCServ Epayment Project that is indicative of the parameters of a service-delivery architecture predicated on more citizen-centric services using a range of integrated channels:

*The NYCServ application streamlines and integrates three key business processes for the city of New York—processing payments, conducting adjudication hearings, and tracking towed vehicles. It has four separate revenue channels: walk-in payment centers, Internet, interactive voice response (IVR) and kiosks. The system processes 1.9 million receipts for a total of over $6 billion in 2003. ... It was developed by an integrated team of approximately 20 per cent Finance Department staff and 80 per cent IBM staff.*[3]

These examples are exciting and provocative, but in general, such fundamental electronically based service transformations have been problematic. Although one can envision the potential for some form of efficiency gains through automated work practises, it is hardly a straightforward calculation—as any financial savings incurred over time must be weighed against the upfront investment costs of new technological systems and the corresponding training, organizational development, and inevitable technological upgrading requirements.

Within the Canadian context there are few examples of genuine long-term service transformation collaborations. One such example is a current collaborative undertaking between BC Hydro and Accenture Consulting that illustrates the evolution of outsourcing into new relational forms of governance tied to joint management and results-based accountability including costs and compensation. This unique, 10-year partnership arrangement is predicated on the formation of a new organizational entity, a limited liability partnership jointly accountable to both parties.

BC Hydro is contractually guaranteed to realize $250 million in cost savings over the 10-year period (by virtue of spending $1.45 billion for services that would have cost $1.74 billion under existing internal systems), as well as agreed-upon measures of performance improvement in customer service (as determined by customer service mechanisms, comparative benchmarking, and a service-level metric system formulated and utilized in concertedly by both partners). In order to generate these sorts of results, the formation of the new entity (with limited and specified functional responsibilities[4]) enables Accenture to develop new and more innovative business processes aimed to the desired outcomes. Notably, all of the previous employees from the government agency have been offered private sector employment on equivalent salary and benefit terms, and labour representation and collective agreement terms remain unchanged.

Despite the relative novelty of this level of complexity and relational activity, the stakes in such initiatives are enormous since if partnerships fail, so too does e-government. This message was underscored some time ago: if IT projects cannot be managed well, the infrastructure for broader organizational renewal and performance improvements can only suffer (OECD, 2001). Moreover, the track record of managing IT has not been encouraging and as discussed above, there is no quick solution for how governments should organize themselves to partner, nor is there agreement as to the optimal scope of partnering activity.

To address such concern and risk, two important trends are becoming apparent in service transformation initiatives. First, affected government agencies are spending far more time up front working out the shape of the long-term service transformation. Second, government and industry are engaging in much higher levels of collaboration earlier on in the partnership development process, not only defining objectives but also preparing the groundwork to achieve them. These shifts are notable departures from traditional public sector management processes that have typically internalized preparation within the government body looking to procure outside services of one sort or another—defining the need in isolation from the very organizations with whom the work will ultimately be undertaken (Dutil, Langford, & Roy, 2005). Two case studies below explore this shift in more detail.

## TWO CASE STUDIES

The first case study comes from the Ministry of Sustainable Resources in the Provincial Government of British Columbia which was faced with the challenge of electronically integrating the collection and delivery of land, resource, and geographic information of 19 separate agen-

cies (in order to make use of this information on cross-ministry issues and provide more accurate, integrated informational resources to external stakeholders in industry and communities).

An integrated land and resource registry (ILRR) for British Columbia (BC) will be a spatially enabled, efficient, and accessible electronic register of all legal interests in crown and private land and resources, which serves the business needs of a diversity of users and clients. The major objectives of the project are to first, design and implement an integrated system of registries (including a business architecture redesign), and second, outline an implementation plan and initiate the building of a new system meeting government's expectations for a single registry that is accessible, efficient, and affordable, thereby securing public interests in effective land and resources management.

There was no simple IT solution because:

- Determining ownership and rights for a parcel of crown land requires converting transactions into registry-like information.
- The complexity of transactions leading to rights increases daily as government changes processes in response to business needs.
- Such technology would be very complex, ever changing, and costly.

In 2002, a phase one contract to complete the business strategy and transitional plan for Integrated Registry Project was awarded to Fujitsu Consulting. The business model and transition strategy were assembled using information gathered from internal and external stakeholders on current business practices and future requirements. It documented the best practices observed elsewhere, the conceptual solution and the reason for adopting this solution in preference to other alternatives.

In 2003, a request for proposals (RFP) was issued seeking to establish a partnership with a lead project consultant. The RFP was built on the recommendations put forth in the Business Strategy and Transition Plan done by Fujitsu. Sierra Systems won the competition, becoming the new lead consultant for ILRR Project. The Business Requirements document (completed by Sierra Systems on February 23, 2004, and available under *Program Documentation*) includes:

- ILRR goals, objectives, and principles;
- Expected use cases; business process that result in creation, maintenance, update, or removal of registered interest in land and resources;
- Existing business process and where they interface with ILRR, as well as required changes to business processes;
- Legislation, regulation, and policy requirements; and
- Business transition plan.

Implementation of the proposed system is proceeding on time and on budget as a result of the foundational elements jointly arrived at via two separate, planning stages—each involving a different private sector partner. This experience underscores the degree to which the business model can be developed in a collaborative fashion and it is possible for the work to be compartmentalized into different phases with different partners thereby avoiding supplier dependency and taking advantage of a wider range of private sector skills and competencies.

Ministry officials worked with Fujitsu Consulting in order to develop clarity about the organizational needs of the project before commencing with an eventual procurement tendering process that resulted in a long-term collaborative arrangement with another technology company, Sierra Systems. Representatives from both companies and the government reported that it was only through openness, transparency, and constant communication between the sectors that the right model was executed to guide the approach now being put in place.

The government of Canada is proceeding in a similar manner in preparing for an eventual service transformation initiative on a government-wide scale. Known as Modernizing Services for Canadians (MSC), this project is a 3-year business transformation initiative (2002-2004) that was undertaken in order to "renew HRDC[5] policies, programs, services, and service delivery by focusing on what citizens need in a way that supports citizen's full participation in the workplace and community." By building a new citizen-centred foundation for HRDC policy, programs, and service, MSC is changing the focus of HRDC from the business of conducting transactions to a new emphasis on building relationships with citizens. It is transforming the current complex delivery network into a single integrated service delivery network that provides seamless, multichannel service to Canadians.

Government managers responsible for this initiative are taking a very deliberative approach to defining exactly what a citizen-centred transformation should look like in the context of their core business lines and their relationships with key stakeholders inside and outside of government. In order to do so, the lead department responsible for this initiative has engaged the expertise of four leading IT consulting companies (IBM, CapGemini, CGI, and Accenture) to assist in defining the vision, clarifying the objectives, and establishing strategies for proceeding with change. One result of this type of preparation has been a detailed business plan that—among other things—sets out a comprehensive approach to

planning, testing and deploying core IM and IT foundational elements to support the business transformation.

The unique aspects of the collaborative relationships underpinning MSC centre primarily on the level of upfront preparation and investment focused on both conceptualizing the opportunity to use ICT to transform service delivery and creating a detailed business plan to move down this path: typically governments define their needs internally within the confines of their own planning processes and then proceed to procure external services and solutions. The four companies were selected in 2003 through a competitive RFP process that awarded each firm with a 2-year agreement for deliverables defined within the MSC strategic framework. Many of these companies had also participated in the initial, Year One (2002) MSC visioning and preliminary research phase.

Conceptualizing the opportunity involved building on the government of Canada's previous and ongoing experiences with related initiatives—notably GOL. At the same time, however, engaging the affected service agencies and private sector companies became central to preparation for the next steps. Those leading MSC within the federal government sought to:

- Learn from best practises around the world (via leading companies with global reach extending across diverse public sector clienteles) and build support across government through education and preparation;
- Actively engage the private sector companies in the management and governance of MSC initiatives; and
- Leverage the early experiences of pilot initiatives within a single department (HRSDC) in terms of integrated, multichannel service delivery.

These three directions form the nucleus of the collaborative effort within government and between government and its industry partners. This collaborative work contributed directly to the preparation of the MSC vision, the major output of MSC Year One. Global research undertaken with the private sector produced key findings, lessons learned, and proven approaches. This knowledge was then applied to the foundational work of Year One in developing citizen-centric service strategies, privacy, client segmentation, integrated channel management, enterprise-wide-enabling solutions, and organizational change.

The collaborations within the federal government and between the government and its industry partners have been largely focused on mapping out the requirements of MSC as it evolves into the single largest service transformation process in the Canadian public sector. A key to the success of this effort has been to undertake a highly deliberative and analytical approach to developing both a vision of service delivery and a comprehensive business case for investments and change in moving toward that vision. A comprehensive set of elements for the business plan have been fostered in concert with industry experts, including IT/IM renewal; human resource management; change management; risk management; and a performance evaluation framework.

One of the key challenges of both designing and pursuing the MSC vision is the significant cultural transformation required to work across traditionally separate units within the affected departments, as well as across the various departments themselves. This type of change requires leadership and champions at the political level—as well as within the public service.

There have been three major impacts of these collaborative relationships:

- First, early results from pilot initiatives have demonstrated the potential of integrated, multichannel service delivery strategies to improve services improvements and save money;
- Second, significant organizational capacities have been developed (across IM/IT, HR, change management, and performance measurement) within the federal government that are necessary elements of the foundation for pursuing the wider service transformation agenda, both within the lead MSC departments and on a government-wide basis; and
- Third, in moving forward to leverage these opportunities and capacities, MSC has been instrumental in laying the groundwork for a more ambitious government-wide effort at service transformation.

The nexus of the first and second points underscores the significant dimensions of undertaking an enterprise-wide approach to service transformation for the government of Canada. Traditionally accountability structures that reinforce individual ministerial accountability and thus separate organizational structures (or silos) have shaped for some time the decision-making culture of government. Shifting to a citizen-centric approach on a government-wide scale is thus a major effort, and one that also underscores the importance of not viewing the service transformation agenda as a technology project (i.e., electronic service delivery within a multichannel environment), but rather as an encompassing agenda for organizational adaptation and performance improvement (Oliver & Sanders, 2004).

With regards to the third point, the potential emergence of a new Service Canada model in 2005 would mark the transition to realizing the goals of convergence and better government-wide coordination capacities to realize citizen-centric service delivery. As a result, the govern-

ment has begun to augment its analysis and understanding of citizen demand for online service delivery and the evolution of multichannel usage that will drive the next phases of service transformation (Roy, forthcoming).

## PROCUREMENT REFORM QUANDARIES

In response to this widening scope of collaboration, new procurement and relational capacities are being sought by governments. Comparative research would suggest that no single option is without difficulty (Dunleavy, Margetts, Bastow, & Tinkler, 2003; Gronlund, 2002; UNDPEPA, 2003). Accordingly, a partnership-based approach to procurement has been slower to emerge in Canada, with the government of Canada in particular preferring a more cautious approach to such issues (Charih & Robert, 2004). The results are significant levels of concern and frustration caused by ongoing difficulties that have plagued large IT projects (Borins, 2004; Langford, 2002; Weil & Broadbent, 1998).

The necessity of significantly reforming procurement systems in the Canadian public sector is now widely agreed upon as a key issue—even as agreement on specific changes remains elusive (Allen & Roy, 2002; Jordan, 1999; Kieley et al., 2002; Langford & Harrison, 2001; Mornan, 1998).[6] The governments of Canada and the province of Ontario have both responded in late 2004 with separate but similar reviews of IT management and procurement in order to probe both root causes and potential solutions. The presentation of the technology sector's leading industry association (Information Technology Association of Canada [ITAC]) to the Ontario review panel offers insight on the current situation in terms of both challenges and potential avenues for reform:

- Many business transformation projects have not met expectations in terms of schedule, cost and requirements;
- IT enabled transformation projects are seen as high risk;
- The reputation of the IT industry and its customers as a whole is impacted by these troubled projects; and
- This has occurred in the private sector as well as government (ITAC, 2004).

In their presentation, ITAC presents a study of IT project failures for which the top three causes are: a lack of clear link between the project and the organization's key strategic priorities including measures of success, a lack of clear senior management and ministerial ownership and leadership, and a lack of effective engagement with stakeholders. In terms of making headway in such an environment, ITAC suggests a range of improvements that while varying in scope and purpose tend to converge around the creation of more flexibility and trust between industry and government. This will be achieved through procurement process reform and a shift to a more inclusive and participative governance approach for each project in order to adapt to changing circumstances while ensuring an ongoing and mutual commitment to agreed-upon objectives, constraints, and degrees of freedom.

ITAC points to the province of British Columbia, which has been among the most aggressive subnational jurisdictions in encouraging public-private partnerships, as an example of the type of procurement to partnering reframing that is required:

The Province of British Columbia has developed a Joint Solutions Procurement Process for the evaluation and selection of vendors in large IT projects. Its basic principle is to engage the private sector bidders in a joint discovery of the risks and benefits of the initiative to assess the capacity, commitment and capability of the private sector bidders. The procurement process follows defined gates where information is disclosed and discussed and the field of potential vendors is finally reduced to two. The final stage engages the finalists in competing bids based on a range of criteria relevant to the business outcomes sought by the government. (ITAC, 2004, p. 13)

This type of procurement approach—emphasizing results and outcomes and innovative solutions for achieving them, is consistent with a lessening emphasis on static, upfront measures of cost and price and a greater reliance on more performance-driven and collaborative-based project management. Although rather novel, the BC government is committed to using such an approach in the future formation of IT partnerships. Similarly, it is this type of approach that will likely be required within the contours of the next phases of the federal MSC initiative—and the emergence of a new Service Canada model to more aggressively pursue citizen-centric service delivery on a government-wide scale.

In moving toward models allowing for greater relational flexibility and creativity, the challenge is to rebalance procurement's control emphasis with the necessity of collaboration. The following distinction is reflective of the tone of the dialogue that is emerging in many jurisdictions and it points to the importance of creating meaningful and tangible linkages that recognize and structure interdependence in an appropriate fashion:

- **Cooperation:** Informal relationships that exist without any commonly defined mission, structure or

planning; and *Collaboration* – A more durable and pervasive relationship involving shared structures and joint authority, a full commitment to a common mission and pooled resources, risks and rewards (Mattessich, Murray-Close, & Monsey, 2001).

Incremental reforms to traditional procurement mechanisms have often sought to facilitate some cooperation between industry and government—but collaboration has been extremely limited, particularly in terms of upfront planning and solutions designing. In contrast, due to growing complexities of new technologies and organizational transformations, the importance of strategic relations is increasingly recognized as an imperative for effective public sector performance: indeed, such a philosophy has been driving BC's reforms (Andison, 2004). A current review of procurement at the federal level underlines the point as well, contrasting the public sector's emphasis on a competitive and adversarial culture with suppliers to the approach used by successful companies and even some governments elsewhere: "successful private sector companies and other jurisdictions avoid an adversarial approach by adopting more strategic relationships with their suppliers" (PWGSC, 2004, p. 24).

Prodded by international experiences and growing provincial reforms, such as those being pursued in BC, federal recognition of such issues is encouraging. Two key tests of more holistic public sector reform in Canada will be (1) whether political leadership will emerge to oversee a more strategic orientation with industry partners than has been the case to present; and (2) if such political support is forthcoming, whether the procurement function will be significantly reorganized and bolstered in strategic importance to reflect a new mix of competition and control on the one hand, and strategic collaboration and relational management on the other. These issues are central to the public sector as a whole since next stages of e-government service transformation initiatives are envisioned to be multijurisdictional, raising the stakes considerably for such matters.

## CONCLUSION

A key question that will determine the effectiveness of the Canadian public sector in achieving the promise of e-government is the extent to which such encouraging, collaborative practises within government and between the public and private sectors, as illustrated in the cases above, represent a sufficiently powerful force to alter the broader institutional environment within which such partnering occurs. While the level of discussion and consultation ongoing presently would suggest a widening appetite for reform, both the structural and cultural barriers to more collaborative governance are deeply engrained and extremely difficult to alter (Allen, Paquet, Juillet, & Roy, 2005b).

Such considerations become more consequential when you realize that the service transformation and e-government agendas of most governments result in a widening scope of partnering since governments are under pressure to achieve government-wide capacities for information sharing and service integration. Unlike previous eras of reform that encouraged individual departments and agencies to tailor their own policies and management systems to their own specific mandates and needs, the necessity of more horizontal governance essentially creates the need for two simultaneous and interrelated levels of collaboration—one within governments and the other between the public and private sectors.

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## KEY TERMS

**Business Process Outsourcing (BPO):** BPO is the outsourcing of back-office and front-office functions typically performed by white-collar and clerical workers. Examples include accounting, human resources, and medical coding and transcription.

**Contract:** A contract is an obligation, such as an accepted offer, between competent parties upon a legal consideration, to do or abstain from doing some act.

**Co-Sourcing:** Co-sourcing is where a business function is performed by both internal staff and external resources, such as consultants or outsourcing vendors, with specialized knowledge of the business function.

**E-Government:** The public sector usage and deployment of information and communication technologies across both policy-making and service-delivery processes.

**Governance:** Formal or informal mechanisms for coordination either within or between organizations.

Insourcing: Insourcing is the transfer of an outsourced function to an internal department of a company, to be managed entirely by employees. The term has also been used to describe foreign companies locating facilities in the United States and employing U.S. workers.

**Joint Solutions Procurement:** For procurements of large-scale, long-term services contracts or where some form of transformation to the business is taking place, a more collaborative process may be the preferred approach.

**Outsourcing:** Outsourcing is the management and/or day-to-day execution of a business function by a third-party service provider. Outsourcing can be provided on or off premises, in the same country or in a separate country.

**Procurement:** The process of obtaining materiel and services which includes the determination of requirements and acquisition from a supply system or by purchase from the trade.

**Public-Private Partnership (P3 or PPP):** A public–private partnership is an arrangement for service delivery, whereby government and private enterprise pool their skills and resources to meet a particular objective.

**Request for Proposal (RFP):** An RFP is a document that requests prospective service providers to propose terms and conditions for a solution (or solutions) addressing a set of requirements.

## ENDNOTES

1 The authors are grateful for the helpful comments of the blind reviewers.

2 Examples include the municipality of Kingston, Ontario, and Suffolk Country in the United Kingdom. Interestingly, the new business model formed by Accenture and BC Hydro is also envisioned to be marketable to other utility organizations (although no financial revenue sharing between these parties has been stipulated at the outset of this example).

3 This New York City initiative, though large on a municipal scale, is hardly unique: it was recognized as a leading example of such schemes, indicative of a trend of such efforts emerging in cities and states across the country. For a complete profile of all initiatives, see "Effectiveness Through E-Payments: Current Learning and Suggested Best Practises," available online at the National Electronic Commerce Coordinating Council (www.ec3.org).

4 They include customer services, IT services, network computer services, human resources, financial services, purchasing, and building and office services.

5 HRDC stands for Human Resource Development Canada, until 2004 the largest federal department in terms of program and service delivery responsibilities (including areas such as skills training, employment insurance, pensions, child assistance programs, student loans, and others). In 2004, the new government split this entity into two, distinct departments (Human Resource and Skills Development Canada on the one hand, and Social Development Canada on the other). This organizational change has had no direct impacts on the governance of MSC, a project that remains jointly managed by both of these units.

6 The evolution of private sector language is revealing in this regard. IBM views itself increasingly as a consulting company and a provider of solutions (disengaging itself from many of its previous production functions), EDS speaks of Co-sourcing, and Accenture consulting points to Business Process Outsourcing—a mix of outsourcing and jointly managed organizational mechanisms.

# E-Learning as Social Inclusion



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## INTRODUCTION

When talking about excluded people and how to develop programs towards digital and social inclusion, there has been little research to individuate targets. So far, there seems to be only two main subdivisions:

- People with either sensorial or motor disabilities who may benefit from specific technologies in order to assure accessibility to digital content.
- People that are digitally illiterate and therefore have to be taught the basics on using the computer and basic applications.

Nevertheless, it is quite clear that the digital divide is a multidimensional phenomenon, and therefore, that digital inclusion strategies will benefit a lot if more specific strategies are developed, individuating problems and solutions related more closely to individual experiences. The aim of this article is to show how e-learning can be used as an e-inclusion tool to help excluded people improve their lives and be socially included.

## BACKGROUND

Most public projects backed by governments, concerned with digital inclusion, tend to centre their focus on issues of hardware: donation of computers, cabling homes, the use of wireless devices, and so forth. Though such issues are obviously unavoidable, they are not the end-all be-all of the digital inclusion matter.

Moreover, as stated in the introduction, the ultimate beneficiary targeted is all too often ill-defined. Generally benficiaries are of two types:

First, we have people with disabilities, in which case, the targeted beneficiary is usually well analysed and segmented into specific groups, given that considerations are different for the blind, the colour blind, the visually impaired, and so on. A quick and serious introduction to accessibility and the Internet can be found at Lawrence and Giles (1999).

Then, we have the general fall-out of the so-called digitally excluded, in which case, the single identifying characteristic is one of computer illiteracy. Thus, one finds little distinction made among such diverse targets as senior citizens, the unemployed, convicts, disadvantaged youth, and so forth. The blanket approach taken for all these groups is to organise practical courses wherein these diverse individuals are taught the how to of surfing the Net, e-mailing, and like activities.

Considering the undifferentiated reasoning underlying such tactics specious, governments should consider alternative approaches to develop e-inclusion processes. A good possibility, which starts to be seen in several European Union (EU) co-financed projects, is to create ambitious e-inclusion programs based on the following imperatives. One of the best introductions for understanding these news imperatives is Warschauer (2003).

1. Overcoming mental barriers as opposed to simply technological ones. Most analyses, like several studies from the Eurobarometer, show that the major causal factors of marginalisation from the information society are those such as the mistrust often felt toward new technologies and the lack of any content attractive or useful to either the socially excluded or those at risk of being so.
2. An approach based on empowerment. It can be held that what is important is not so much knowing how to use, for instance, Netscape or Outlook, but rather the educational and liberating potential of new technologies. We seek to make the Internet an instrument for integrating the socially excluded by using it to equip them with the skills that will make them employable in the information society. Furthermore, we seek to develop their capacity to think critically, to form their own political views, and to organise themselves as citizens and cultural groups. The potential realisation of such substantial goals advocates thinking about ICT (information communication technologies) in more social terms rather than through a reductive technical approach.

## STRATEGIES TOWARDS SOCIAL INCLUSION USING E-LEARNING

The following is a list of the five strategies that, at this stage in the research, seem the most promising in terms of

establishing the best practice in the use of e-learning for social and digital inclusion.

First, the strategy of combining teaching ICT with other non-digital knowledge is equally important to social inclusion. An example of this approach is the case of a gypsy community wherein computers were used as a tool to prepare for a driving exam. The usefulness of this tool was enough to convince several adults from the community to participate in e-learning activities. Similarly, it has been found in other best practices that, in order to motivate adults to use such tools as Microsoft Office or a Web browser, it was vital to show to them how such knowledge would help them find employment. You can see that strategy more clearly described at www.5d.org, which describes in detail the specific e-learning devices and methodology used. This is an effective strategy for three reasons. First, the students are much more motivated, since they associate learning ICT with something of genuine concern to them, obtaining a driver's licence, a job, and so forth. Second, there is an efficiency factor to combining learning purposes; that is, at the same time the learners acquire Internet skills, they also acquire others such as learning how to drive. Third, the fulfilment of the goal of social inclusion is greatly enhanced, given that not only digital skills are imparted, but also other skills which, though not digital, are nonetheless vital to social inclusion.

The second key strategy is communication. Our analysis of failures has demonstrated that if the proposal is not properly communicated, it will not fulfil its objectives. There are innumerable Web sites dedicated to helping women or immigrants that, however well they may be designed and organised, do not succeed in doing so because the 'target' does not know they exist. Communication needs to be appropriate to both the target and its geographical situation, that is, if it is local, national, or international in character. Furthermore, it must make use of non-digital means to deliver the message, given that the target group is precisely the digitally excluded.

A third strategy is to establish peer to peer teaching systems. That is, in the degree to which it is possible, it is desirable for the students to teach each other. This can be structured either formally or informally. In the former case, the students are 'promoted' to the level of teachers; the important implication here is that if enough students are inspired to adopt a teaching role, sustainability is guaranteed. Meanwhile, in less formally structured situations, the help the students offer significantly reinforces the cognitive relevance of what has been and is explained and greatly boosts motivation. Again, the 5D project (www.5d.org) used this strategy also with impressive results within the gypsy community.

The fourth strategy is to create informal environments and has the advantage of being applicable for various target groups. For instance, the traditional class environment for teaching computer skills can be very boring for children who are not used to it. Organising something more informal and experimental, where the children use the computer as a toy, can be highly effective. Likewise, such formal teaching environments might be intimidating for immigrants whose cultural background is significantly different from the host country's. They may feel more comfortable in less formal circumstances. Moreover, much the same can be said with regard to certain groups of women and senior citizens. A very interesting example is the collective Herein in Austria who adapt Web sites for e-learning projects with migrants to the cultural specificities of the migrant's culture, making it therefore easier to access and use (www.herein.at).

The fifth strategy is to use teachers similar to the students themselves, something that is particularly well documented in cases of e-learning focused towards women. Since digital technology tends to be thought of as man's world, adolescent girls often do not feel motivated by it. Hence, it can be advantageous to use female monitors to explain the use of a given e-learning environment, as well as female avatars to present content. Though the effect may be a subconscious one, it can be important nonetheless, as it goes towards breaking the stereotype that only men can handle ICT. A similar phenomenon has been observed in the case of immigrants; an instructor from the same culture tends to be more motivating, however well the immigrant speaks the local language. A good example of this is the Eclectic Technology Carnival organized by Genderchangers (www.genderchangers.org) who arrange specific events for women, using female professors, arranging more relaxed environments, and selecting content and ways to present them which appeal more to women.

## FUTURE DEVELOPMENTS

After a careful analysis of real e-learning practices towards e-inclusion, considering the key strategies and analysing where information and technological advances were more needed and relevant, we have found the following five key areas which are good starting points for both implementation and further research:

### Social Solutions to Social Problems

Although there is always some co-influence between technology and social practices, we should not forget that social practices define how technology is finally used, and not the opposite. A good argumentation of this thesis can be found in Marzo (2003). We should neither forget that digital technologies are never neutral. If not

used appropriately, they can expand the social divide, instead of diminishing it. If we want to have a really inclusive information society, we need to address the social problems that have turned people into the digitally excluded, and not only consider the ones derived from lack of structure. When digital exclusion is considered, not everyone has been created equally. There is an important qualitative difference between someone who is already excluded and needs to understand and use ICT, and someone who only needs some formal knowledge to jump in. This is a general principle which we think should permeate research in interacting with computers: instead of simply analysing the technical features offered by the provider or studying the *de facto* use by some groups, think creatively about the social uses of digital technology and find new uses and strategies that are more meaningful for excluded people.

## Community and Awareness

Learning communities is a hot subject nowadays. Nevertheless, they are mostly viewed as mere instrumental concepts towards improving learning. Again, this is useful, but it is not enough. ICT offers us wonderful social software which can be used in original ways to help real communities to expand their political, social, and cultural horizons. Isolated communities can use digital technologies to be better known and respected in society. The dispersed ones can use several digital tools to stay in touch and continue developing their own lifestyles and culture. We should also keep in mind all the awareness power that lies in the Internet to describe and fight social exclusion. This strategy is key when we are considering rural isolated communities and migrants that are working far away from their homes. They can also become an important measure to fight sexism in the computer world and help women to join and transform ICT. An excellent analysis of how social capital permeates digital networks can be found at Huysman and Wulf (2004).

## Towards the Transparent PC

Computers and software improve and new features are developed every year and therefore become more difficult to use. This may be fine for users that are familiar with ICT. However, it makes thing worse every year for the digitally excluded, especially when older people or people with disabilities are considered. In fact, we consider this "new feature" strategy deeply wrong from a social and educational point of view. We need to reverse it. We have to consider strategies and technologies to make them more intuitive and easier to use. Our grail, as the title suggests, is a transparent computer; something that it is so easy to use that it needs almost no instruction. A camera or a car are fairly intuitive technologies. To take a picture, you just direct the camera to the place you want to photograph and click the button. If you want to turn right, you just move the wheel right. Why can ICT not be like that? A comprehensive and powerful description of such tendencies can be found in Norman (1998).

## Problem Solving Methodology for Digital Content

Because our target has specific needs, we need to avoid academicism, and to construct courses that are useful, practical, and motivational. This surely implies something that is usually neglected when thinking about learning strategies in digital media: the specific social and cultural context. Lack of trust and of motivation are important barriers towards e-inclusion. We will never cross those gates if we just create the typical "how-to" courses. Besides, information society becomes more and more competitive. In a few years, just knowing how to use a word processor or an e-mail client will not make any difference in the job market. This is another reason to search for problem-solving methodology. A general course on how to use graphic edition software is of little use, but a problem solving course on how to make flyers for clubs is both a good motivator and even a job opportunity for an unemployed youngster in a challenging neighbourhood. For more information, see Alexander, Ishikawa, and Silverstein (1979) and Gardner (1998).

## Internet for Everybody

Software technologies are plastic enough to be adapted to any specific need a special collective may have. Unfortunately, very few companies, administrations, or individuals use that characteristic. We need to raise awareness on that topic among software and hardware producers, Web designers, and educators. Here, research is key in order to find both market and cognitive strategies to turn adaptation towards accessibility more and more common.

When accessing culture, physical barriers like distance or architecture are a challenge to people with mobility problems. Books are of no use to people with visual difficulties. It is a shame that most digital cultural products, which can avoid these barriers easily, are not really adapted to these people's needs.

# CONCLUSION

In summary, e-learning towards e-inclusion, needs to combine both technical and cognitive approaches. Teach-

ing technical skills involving the use of a computer or Internet turn out to be useless if unaccompanied by motivation and contextualisation. New solutions have been all too often overlooked, due to the predominance of an exclusively technical focus on the issue. In essence, the strategies put forth are moving towards a new paradigm, one based upon more informal teaching environments, wherein the communication among peers is fundamental, and damaging stereotypes regarding new technologies are avoided. Of course it goes without saying, that these practices are all unviable without a necessary minimum of infrastructure, that is, access to a computer and the Internet. However, it is just as clear that investment based on providing technical means is ineffective when unaccompanied by a new methodology, one based on contextualisation and motivation. Rather, the battle against the digital divide must be waged on both fronts.

Digital inclusion does not mean merely to teach people how to surf the Web or how to send e-mail. These are only the building blocks. We need to do a lot more to ensure that excluded people can use the Internet to expand their competences and capacities to empower themselves and achieve a better life. Future research in the topics listed in the Future Developments section will be of great help in improving both our knowledge and the practical strategies to teach excluded groups how to interact with computers and become more included in society.

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## KEY TERMS

**Digitally Excluded:** Those people that, due to a variety of reasons, from cultural to social and economical, are not able to access computers and the Internet. The reason may be lack of access to them or lack of knowledge to use them.

**E-Inclusion:** There are at least two different ways to interpret this term: (1) the process to teach people how to use computers and therefore help them to avoid the digital divide; (2) the process to include people socially using ICT.

**E-Learning:** A series of learning processes and strategies that use the interactive powers of ICT in order to facilitate access to knowledge and continuous training, and use innovative learning techniques. The mere access to noninteractive material, for example, a book in HTML format, should not be considered e-learning *per se*.

**Learning Communities:** A term originally developed in the higher education context, referring to the process to link several courses together so students are able to get deeper understanding of one subject, as well as developing multidisciplinary studies. Learning communities also facilitate the communication between students and the possibility to access different professors.

**Problem-Solving Methodology:** Originally, a methodology from artificial intelligence that tried to mimic using computers the way humans solve problems. Nowadays it is also used in e-learning projects in order to present the information in a more interactive, suitable, and helpful way.

**Social Capital:** In the context of this article, we use the term to refer to the value that one gains when joining a network.

**Transparent/Invisible Computer:** A metaphor invented by Donald Norman referring to the need to create digital interfaces and devices that are so intuitive that they are very simple to use, so simple that one does not need special training to start doing things with it.

# E–Learning through HCI



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## INTRODUCTION

E-government is using electronic technology to streamline and/or to improve the business of government and, as a result, to improve its citizens' personal services; for example, patient hospital appointment booking systems, electronic voting, and the development of e-education. E-education and, from this, e-learning depend not only on the quality of the content but also on that of the human-computer interaction (HCI) generated by designers and implementers of a system.

HCI is a cross-discipline subject that covers a wide area of topics, many of which need to be considered in e-learning, that directly affect the student, the tutor, or the administrator. HCI delivering e-learning includes issues such as psychology, sociology, cognitive science, ergonomics, computer science, software engineering, users, design, usability evaluation, learning styles, teaching styles, communication preference, personality types, neurolinguistic programming language patterns, and so forth.

This article considers interpersonal communication and the effective transfer of knowledge from one human to another (e.g., a teacher to a learner) in the real world; it then postulates on their replication in distance/e-learning. The article focuses on the factors required for effective e-learning in the field of HCI for education. In particular, it introduces the concept of using communication preference (CP) and learning styles/personality types (LS) in an intuitive interactive tutorial system (in TS). The development of WISDeM (Web Intuitive/interactive student distance education model) by the authors significantly exemplifies this in its evaluation results.

## BACKGROUND

In this section, we discuss distance learning, learning and teaching, CP, LS, neuro-ergonomics, neurolinguistic programming (NLP), and NLP language patterns.

### Distance/E-Learning

Distance/e-learning is training that can be (1) live instruction that is conveyed in real time via telecommunications facilities, (2) accomplished on a point-to-point basis or on a point-to-multipoint basis, and (3) conveyed in many forms (teleseminar, teleconference, electronic classroom, using text and/or audio and/or video). In essence, a live tutor or computer tutorial system trains the learner when the learner is at a different geographical site and sometimes at a different time. Currently, the live tutor has the ability to adapt to the learner as relevant—computer tutors do not replicate this ability.

Lawler and Yazdani (1987) consider that a computer tutor, in order to provide adaptive instructions, must have a strategy that translates its tutorial goals into teaching actions and that, as a consequence, research on teaching strategies is central to the construction of an intelligent tutoring system. Programming the computer tutor can adapt it dynamically at runtime to (1) focus on the fluctuating cognitive needs of a single learner over time and (2) output content and form of knowledge and/or instruction to the learner's understanding of the subject matter. In order to provide adaptive instruction, a tutor must have a wide range of instructional actions (the principal of versatile output). One learner may need a definition; another may need an explanation. Ghaoui and Janvier (2004) ask, "What about changing the output to match both the learner's communication preference and learning styles?"

### Learning and Teaching

Every teacher is a learner; thus, while we consider learning and the way we learn, the corollary is that teachers use their learning experiences to teach and to develop their own preferred teaching styles. Cotton (1995) considers that learning usually is the active process in which the learner remembers the input of an instance and interprets this input subject to preconceptions. The input and retention of some instances can be the result of passivity (e.g.,

knowing that an insect bite can hurt normally is not the result of active learning). Learning enhances the ability to learn that practice makes perfect.

Gagnon, Collay, and Gagnon (2001) consider that the art of constructing meaning out of instances results in a learner learning to learn (constructivist learning). Crucially, this is a cognitive mental activity. While the input of instances well may depend on physical action, the cognitive consideration of those inputs depends on reflection of those inputs (reflective learning) (Coffield, Mosley, Hall, & Eccleston, 2004). There are many styles supported and adopted by teachers for passing on their own knowledge to students, while students exhibit their own personal learning styles based on their personality and life experiences (Janvier & Ghaoui, 2002).

A basic point to remember is that in order for conscious communicative learning to take place, passage of information between the teacher and the learner relies on the use of a jointly understood language, and the use of words is subject to the possibility of misinformation. What the learner understands words to mean may not be what the teacher means, which can be exemplified by the following problems: (1) *preconceived ideas*—the learner tends to ignore what he or she thinks is known or is like something that is known; (2) *ashamed to admit lack of knowledge*—the learner does not like to admit that the communication being used is not understood; and (3) *loss of interest in the communication*—clarification and confirmation of understanding is essential (Cotton, 1995).

A learner usually transfers sensual input into permanent input by rehearsal— the repeated exposure to a new idea or fact—the way the brain revisits experiences while we sleep. Waking up with some instantaneous inspiration is not instantaneous; the brain has been working at the subconscious level before recall makes it conscious (Catania, 1992). A learner also requires the correct type of feedback; inappropriate feedback or classical conditioning (e.g., destructive criticism) creates an ever-increasing barrier to learning (Cotton, 1995).

A tutor has a preferred style of communication, which influences his or her choice of teaching style or theory in a given instance. If this communication style matches the student's preferred communication style, then excellent communication takes place, if not, communication is less effective. Thus, in order to be fully effective, a tutor needs to temporarily adjust his or her communication style to that of the student's (Catania, 1992).

## Communication Preference

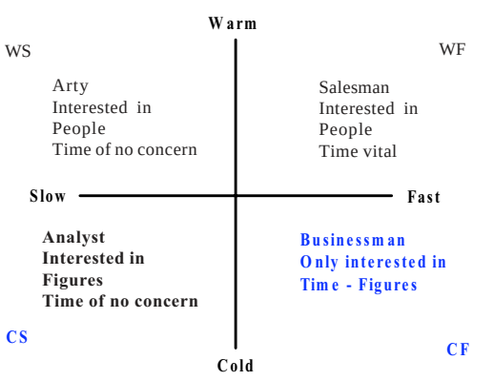
Everyone has his or her preferential technique(s) in order to exchange ideas with others, acquire knowledge, and pass knowledge along to a third party. This is called communication preference, which has been the basis of much research (Janvier & Ghaoui, 2003b). Almost all learning is external to the body; one of the five senses (touch, sight, taste, hearing, and smell) introduces it. The input is filtered, interpreted, and assessed against previous input, beliefs, and concepts using perceptual constancy, perceptual organization, perceptual selectivity, and perceptual readiness. Stored instances are not a true representation of the actuality due to the fact that they already have been distorted by the subject's own interpretation of the facts as perceived by the inner voice, eye, ear, nose, and taste (Cotton, 1995).

## Personality Types

Different personality types require different communication treatment. It is possible to plot all these types somewhere on the WC/SF scale, as seen in Figure 1.

- **WS types** prefer the company of others, are slow to make decisions, take their time, and sometimes will not make a final commitment. They get along very well with other WS types and often communicate well with WS and WF types; they do not like the CF type. They can be categorized as *Arty*.
- **CS types** prefer their own company, are slow to make decisions, take their time, and sometimes will not make a final commitment. They are very precise, and they get along very well with other CS types. They often communicate well with WS and CF types; they do not like the WF type. They often are categorized as *Analytical*.
- **WF types** prefer the company of others, are fast to make decisions, and often make a commitment before thinking it through. They get along very well with other WF types and often communicate well

*Figure 1. Personality types (Janvier, 2004)*



with the WS and CF types; they do not like the CS type. They often are categorized as *salesmen/conmen*.

- **CF types** prefer their own company, are fast to make decisions, and often make a commitment before thinking it through. They get along very well with other CF types and often communicate well with the CS and WF types; they do not like the WS type. They often are categorized as *businessmen*. (Janvier & Ghaoui, 2003b; Myers & Myers, 1995)

In order for effective communication to take place, the communicator and the subject need to be close to each other's type. The communicator has the responsibility to move and adapt style. Fortunately, although dominant personality types are fixed at about the age of 18, subjects use their Jungian secondary functions, tertiary functions, and so forth, as required. Between the ages of 12 and 20, we develop and use the auxiliary function as a powerful support to the dominant function. From ages 20 to 35, we begin to use our tertiary function more frequently and with better success. From 35 to 50 we pay attention to our inferior function, and from 50 onward, we tend to use all four functions in a rounded manner. Research indicates that people without a strong auxiliary function to complement their dominant function have problems dealing with communications; the introverted personality type tends to hide the dominant function and show the auxiliary function to the world; the extroverted type shows the dominant function (Murphy, Newman, Jolosky, & Swank, 2002; Wilson, Dugan & Buckle, 2002).

## Neurolinguistic Programming and NLP Language Patterns

NLP can be defined as "the Study of the Structure of Subjective Experience and what can be calculated from it" (Sadowski & Stanney, 1999). Subliminal communication occurs in any face-to-face communication when the senses, mainly iconic, receive body-language input. In particular, the eyes convey a myriad of signals of which eye accessing cues are particularly useful. The name neurolinguistic programming comes from the disciplines that influenced the early development of its field, beginning as an exploration of the relationship between neurology, linguistics, and observable patterns (programs) of behavior (Pasztor, 1998; Sadowski & Stanney, 1999; Slater, Usoh & Steed, 1994).

John Grinder, a Professor at the University of California at Santa Cruz and Richard Bandler, a graduate student, developed NLP in the mid-1970s. They were interested in how people influence one another, with the possibility of being able to duplicate the behavior and, thus, finding a way to influence people. They carried out their early research at the University of California at Santa Cruz, where they incorporated technology from linguistics and information science and knowledge from behavioral psychology and general systems theory, and developed their theories on effective communication. As most people use the term today, NLP is a set of models on how communication influences peoples' subjective experience. It is more a collection of tools than any overarching theory. Much of early NLP was based on the works of Virginia Satir, a family therapist; Fritz Perls, founder of Gestalt therapy; Gregory Bateson, anthropologist; Milton Erickson, hypnotist; and Stever Robbins, NLP Trainer (Bandler & Grinder, 1990).

It is possible to make eye movement cognitive by observing the direction in which the eyes are moving during conversation. When eyes move in a certain direction, one can detect if the subject's thinking is visual, auditory, or kinaesthetic/emotional. Eye dominance governs eye movement with right-eye dominance signals going to the left cortex and left-eye dominance to the right cortex.

Assuming that the subject is right-eye dominant, the following pertains:

- **Visual Remembered:** (Eyes up to the left)—recalling past images
- **Visual Constructed:** (Eyes up to the right)—vision conceptualization
- **Auditory Remembered:** (Eyes to the left side)—recalling past sounds
- **Auditory Constructed:** (Eyes to the right side)—conceptualization
- **Auditory Digital:** (Eyes down to the right)—talking to himself or herself
- **Kinaesthetic/Emotion/Feelings:** (Eyes down to the left)—feels emotions, sense of touch, or muscle movement (Pasztor, 1997, 1998; Sadowski & Stanney, 1999).

Craft (2001) explores relationships between NLP and established learning theory and draws a distinction between models, strategies, and theories. Craft (2001) argues that, while NLP has begun to make an impact on education, it remains a set of strategies rather than a theory or a model. NLP well may be a set of strategies; however, research has shown that this set of strategies results in increased memory retention and recall. For example:

- Pasztor (1998) quotes the example of a student with a visual NLP style, whose tutorial learning strategy was based on "listen, self-talk," and sport-learning strategy was based on "listen, picture, self-talk";

the former did not achieve memory store/recall, while the latter did.
- Pasztor (1998) reports that rapport with a partner is the key to effective communication and that incorporating NLP in intelligent agents will allow customization of the personal assistant to the particular habits and interests of the user, thus making the user more comfortable with the system. Introducing the correct submodality (visual, auditory, kinaesthetic) will enable the subject to more easily store and recall instances in/from memory.

It is argued that inviting a subject to *see* invokes iconic; to *hear* invokes auditory; and to *feel* invokes kinaesthetic recall (Pasztor, 1997).

## MAIN ISSUES IN REPLICATION

In this section, we cover a successful example of an actual replication of HHI in HCI.

### Replication in a HCI Distance/ E-Learning Tool

HCI distance/e-learning tools have been widely developed both commercially and as academic research tools:

- Two good examples of commercial tools are Blackboard™ and WebCT™, which concentrate on a general menu and offer individual, synchronous, and asynchronous learning/communication; these cover the general requirements of most educational establishments.
- There are many types of academic research tools that include artificial intelligence (AI) and/or an intelligent tutoring system (ITS).

Murray (1997) postulates that while ITSs are becoming more common and proving to be increasingly effective, each one still must be built from scratch at a significant cost. Domain-independent tools for authoring all aspects of ITSs (domain model, teaching strategies, learner model, and learning environment) exist and go beyond traditional computer-based instruction while trying to build models of subject matter, instructional, and/or diagnostic expertise. They can be powerful and effective learning environments; they are very expensive in time and cost and difficult to build. To launch effective systems requires a paradigm shift from a storyboarding to a data-based authoring paradigm. Fundamental is the separation of database content from instructional methods, where authors represent their knowledge explicitly and modularly, to the creation of explicit representations of the content and the instructional strategy.

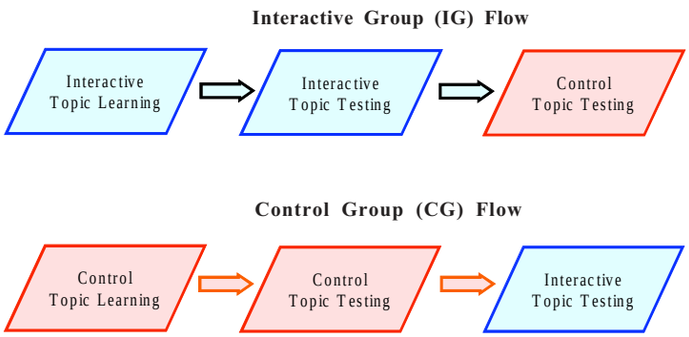
Of particular interest are Ainsworth et al.'s (2002) REDEEM and Ghaoui and Janvier's (2004) and Janvier and Ghaoui's (2003a) WISDeM. All of them use approaches that combat the problem that ITSs are difficult and expensive to build.

- REDEEM is an authoring tool that authors pedagogy that is concerned primarily with the development of tutoring strategies, not with the construction of domain material that allows the tutor to create content with freedom and then to link this content with the teaching strategy selected for each individual student as selected by the tutor.
- WISDeM is an authoring tool that is concerned primarily with ensuring that the student receives knowledge in a way that is commensurate with his or her communication preference and learning styles. This removes the tutor's preconception of personality type in exchange for two psychometric tests that form the basis of the student's profile.

Janvier and Ghaoui's (2004) research has shown that 60% of students are extroverted, and 40% are introverted (see Personality Types evaluation results). An introvert tends to show his or her secondary Jungian Function (Kakabadse, Kousmin, & Chatham, 2004) and not what he or she really requires; this is hidden. Research shows that a student's basic learning style is established before he or she joins higher education; however, outwardly, the student will use his or her secondary and tertiary Jungian Functions, if it is more appropriate. Thus, the introvert often will use his or her secondary extrovert function to mask the introverted nature (from experience, the introvert has found that it is more appropriate) (Janvier & Ghaoui, 2003b; Wilson et al., 2002).

WISDeM (Janvier, 2004; Janvier & Ghaoui, 2003b, 2004) has been developed successfully to offer a Human-Centered Generic intuitive interactive tutoring system (inTS). It was designed to cover all normal DLT requirements for higher education. It includes one-to-one interaction between student and tutor. The system replaces the tutor and replicates, in part, tutor-student live interaction. The project thesis is as follows: "Matching neurolinguistic programming (NLP) language patterns in an online distance learning tool, with the learner's communication preference and learning styles, will provide an intuitive tutoring system that will enhance human-computer interaction and communication and, thus, enhance the storing and recall of instances to and from the learner's memory, thus enhancing learning." The evaluation of the model indicated that the memory retention made by the test students compared to the control students evidenced

*Figure 2. Interactive group flow and control group flow charts show how the two groups completed the evaluation exercise in order to ensure comparative analysis between both types of interfaces and comparison of the interface components for both types (Janvier, 2004)*




greater memory retention of about 10%. The statistical analysis of the results using both one-way ANOVA and two-sample T-Test gave a *P-value* at 0.005, thus providing a very strong indication that the thesis hypothesis is strongly supported (Clarke & Cooke, 1978; Thompson, 1992; Yates, Moore, & Starnes, 2002) for statistical evidencing.

The evaluation involved 97 students (86 male, 11 female).

- Students were drawn from the 3rd-year degree computer science course and, thus, evidenced similar experience and knowledge.
- Communication preference varied (visual (V) - 67.01%; auditory (A) - 27.84%; and kinaesthetic (K) - 5.15%) compared to VAK communication preference, as reported by researchers as V = 60%, A = 30%, and K = 10% (Brown, 2001; Catania, 1992; Cotton, 1995; Janvier & Ghaoui, 2003b)
- Personality types provided a split between extroverts (59.79%) and introverts (40.21%).

Direct observation, used for the evaluation, required the creation of two groups—the interactive group (IG) and the control group (CG)—in order to extract comparative information on the use of both types of interface; thus, both groups needed to experience the two types of interface interaction (see Figure 2).

The IG used the interactive interface first and then the non-interactive interface; the CG used the non-interactive interface and then the interactive interface. In this way, each group experienced both interface types, and comparative results were compiled that allowed definitive evaluation of the experiences of both groups.

The concept for each approach is to allow a student to experience either the intuitive interactive interface (IG) first and then experience the non-intuitive interactive interface (CG), or vice-versa. This achieves four objectives for the analysis:

1. It allows the student to experience both types of interface, which enables him or her to be able to make comparative assessment of the two types of interface and to provide subjective feedback.
2. It allows the evaluator to collect observational feedback, to ask specific questions about the student's reactions to the two interfaces, to rate this subjective feedback, and to make notes about the student's feelings concerning his or her experience; this information is used in the anecdotal and subjective analysis.
3. It allows the system to collect hard data for the statistical analysis.
4. It allows comparison of the gain in knowledge retention of one route with the other.

## Summary of the Evaluation Results

The evaluation results indicate that WISDeM's intuitive interactive system is likely to make a significant improvement to student learning and remembering. Measuring the evaluation results against the success criteria provided the following:

- Do IG students demonstrate a larger gain in correct marks scored when answering the questions (in the Q&A facility) than the CG students do?
  **Yes**. P=0.005 (means of 15.00:4.22). This is a signifi-

cant result that strongly supports the hypothesis that the inITS improves remembering; it is strong enough to warrant further research.

- Does memory retention improve more by the IG students than the CG students do, as evidenced by higher comparative marks?
  **Yes**. P = 0.036 (means of 70.00:55.00). This is a significant result that quite strongly supports the hypothesis that the inITS improves memory retention.
- Is the increase in the correct mark's score for the IG route greater than the CG route*?*
  **Yes**. P = 0.036 (means of 70.00:55.00). This is a significant result that quite strongly supports the hypothesis that the inITS improves memory retention.
- Does the IG route, compared with the CG route, increase memory rehearsal?
  **Yes**. The interactive students used the facility buttons 10.21 times each and evidenced use of facilities not offered to the control students, whereas the control students used the facility buttons 8.93 times each. This indicates that the IG student appeared to be more involved and demonstrated greater interactivity.
- Is the IG route, compared with the CG route, evidencing a greater increase in enjoyment of and interest in using the system and, therefore, encouraging learning (greater use of facilities [links and buttons] equates to success)?
  **Yes.** The anecdotal data evidenced this. They also evidenced greater use of the facilities by the IG students, compared with the CG students. This indicates that the IG student appeared to be more involved and demonstrated greater interactivity.

In each instance, the evaluation indicated support for the criteria and hypothesis, pointing the way for further research. (Janvier, 2004)

## FUTURE TRENDS

All current tools seem to heed HCI principles except, for example:

- Accessibility, a vital component in the creation of an effective DLT.
- Creating an effective student model before the student uses the DLT; this model takes cognisant of the student's communication preference, learning styles, and motivational factors.
- Avatars that are designed to interact with the student, where the student has full control of the avatar's features and voice and where the avatar's features demonstrate a student-mirror image visage in reacting to sensual input (eye gaze, pupil size, eye movement [iconic, auditory, or kinaesthetic]).

## CONCLUSION

The importance of this research is that it indicates the following:

1. The replication of human-human interaction, as evidenced by well-trained councillors interreacting with their clients on a one-to-one basis, can be introduced into a Distance Learning Tool.
2. CP and LS introduction is likely to significantly improve the tool for its students.
3. An inTS can have CP and LS/personality types replication incorporated successfully, thereby enhancing memory retention.
4. The inclusion of the CP and LS facility in e-learning tools is likely to improve effectively the target results for which the government is striving in e-learning/e-education.

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## KEY TERMS

**Avatar:** An image that represents a user in a multi-user virtual reality space.

**Communication Preference:** The art and technique of selecting your own preferred words in order to effectively impart information or ideas to others.

**Distance Learning:** Learning that takes place when the instructor and student are separated by space and/or time. The gap between the two can be bridged using technology, such as audiotapes, videoconferencing, satellite broadcasts, and online technology, and/or more traditional delivery methods such as the postal service.

**Human-Computer Interaction (HCI):** Human-computer interaction is the study of how humans interact with computers, and how to design computer systems that are easy, quick and productive for humans to use.

**Human-Human Interaction (HHI):** The way a person acts and reacts to another person or persons. It is the mutual or reciprocal action and interacting between two people, where each takes conscious or subconscious notice of each other's body language and verbal communication in order to govern the way each person responds.

**Intelligent Tutoring System (ITS):** An ITS consists of (1) a user interface; (2) an expert model or knowledge model representing the domain expert's subject matter; (3) a student model or learner model representing the student; and (4) an instructional model that holds the pedagogical data.

**Learning:** The cognitive process of acquiring or refining skill or knowledge and the storing of these in long-term memory.

**Learning Styles:** The 16 styles made up of these four couplets types: Extrovert|Introvert, Sensing|Intuition, Thinking|Feeling, and Perception|Judgement.

**Modalities:**

- **Auditory:** Use of auditory imagery: hearing, tonality, pitch, melody, volume, and tempo;
- **Kinaesthetic:** Use of emotional, feeling, movement imagery: intensity, temperature; and
- **Visual:** Use of visual imagery: sight, color, brightness, contrast, focus, size, location, and movement.

**Neurolinguistic Programming (NLP):** The study of the structure of subjective experience and what can be calculated from it.

**Neurolinguistic Programming Language Patterns:** The use of words or similar constructs: "See" for iconic, "Hear" for auditory, and "Feel" for kinaesthetic subjects both in language and text at the relevant times.

**P-Value:** Represents the probability of a result of a test of association having occurred by chance, if there actually was no association among the variables. Probability values only can lie between 0 and 1, and P-values never actually reach 0 or 1. If the P-value is less than 0.05, it signifies that a result like this only could have appeared by chance 5% of the time, if no association actually existed, which is a statistically significant finding.

# Electronic Business Models Design for Public–Private Partnerships

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## INTRODUCTION

Public-private partnerships (PPPs) provide an alternative model for producing and delivering public services, both the traditional public services and the electronic ones (i.e., the ones delivered through electronic channels, such as the Internet or other fixed or mobile network infrastructures; Aichholzer, 2004; Andersen, 2003; Broadbend & Laughlin, 2003; Jamali, 2004; Lutz & Moukabary, 2004; McHenry & Borisov, 2005; Nijkamp, Van der Burch, & Vidigni, 2002; Spackman, 2002; Wettenhall, 2003). The basic concept of the PPP model is that the public and the private sectors have different resources and strengths, so in many cases, by combining them, public services can be produced and delivered more economically and at higher quality. In this direction, a PPP is a medium to a long-term relationship between public organizations and private-sector companies, involving the utilization of resources, skills, expertise, and finance from both the public and the private sectors, and also the sharing of risks and rewards in order to produce some services, infrastructure, or other desired useful outcomes for the citizens and/or the businesses.

Information and communication technologies, and in particular the Internet and WWW (World Wide Web) technologies, have opened a new window of opportunity for a new generation of PPPs for offering new electronic public services in various domains, for example, for developing and operating public information portals (Andersen, 2003), electronic transactions services (Lutz & Moukabary, 2004), electronic payment services (McHenry & Borisov, 2005), value-added services based on public-sector information assets (Aichholzer, 2004), and so forth. However, before such a new service is developed, it is of critical importance to design systematically and rationally its business model, which, according to Magretta (2002), incorporates the underlying economic logic that explains how value is delivered to customers at an appropriate cost and how revenues are generated. Vickers (2000) argues that most of the failures of e-ventures (also referred to as dot-coms) are due to the lack of a sound business model or due to a flawed business model. However, most of the research that has been conducted in the area of e-business models is dealing mainly with the description and abstraction of new emerging e-business models, the development of e-business-models classification schemes, and the clarification of the definition and the components of the business model concept, as described in more detail in the next section. On the contrary, quite limited is the research on e-business-models design methods despite its apparent usefulness and significance; moreover, this limited research is focused on private-sector e-business models. No research has been conducted on the design of PPP business models for offering electronic services.

In the next section of this article, the background concerning PPPs and e-business-models research is briefly reviewed. Then a new framework for the design of e-business models is presented, which has been customized for the design of PPP business models for offering electronic services. Next, the above framework is applied for the design of a PPP business model for the electronic provision of cultural-heritage education for the project E-Learning Resource Management Service for the Interoperability Network in the European Cultural Heritage Domain (ERMIONE) of the eTEN Programme of the European Union (Grant Agreement C517357/2005). Finally, the future trends and the conclusions are outlined.

## BACKGROUND

PPP is defined as "an institutionalized form of cooperation of public and private actors, which, on the basis of their own indigenous objectives, work together towards a joint target" through "leveraging joint resources and capitalizing on the respective competences and strengths of the public and private partners" (Jamali, 2004, p. 416). Even though in the past various forms of public-private mixing arrangements had been used (such as mixed enterprises, outsourcing, subsidization, etc.), the concept of PPP appeared in the early '90s when the Private Finance

Initiative (PFI) was introduced in Great Britain; it envisaged that private companies would design, build, operate, and finance hospitals, schools, prisons, and so forth, and the government would agree to purchase their use as a service for a fixed period of time (Spackman, 2002; Wettenhall, 2003). The evolution of the PFI concept resulted later in the PPP concept. In general, PPPs shift government ministries and agencies from financing, owning, and operating assets to contracting the private sector to finance, build, and operate assets, and to deliver public services using these assets. The private sector is paid for these services, or is given a share of the income generated from them or some other rights. The main drivers for PPP have been improving efficiency in the production and delivery of public services, and finding alternative methods of financing the investments required for developing public infrastructure and for offering public services.

A wide spectrum of PPP forms have been used for achieving various public-sector objectives, such as public-infrastructure building (e.g., roads, bridges, hospitals, energy stations, telecommunications, etc.), urban-areas renewal, rural-areas development, the solving of various social problems, environmental protection, education, the provision of community-based services for disadvantaged children, technology research and development, and so forth (Jamali, 2004; Nijkamp et al., 2002; Spackman, 2002; Wettenhall, 2003), and recently for the provision of electronic services (Aichholzer, 2004; Andersen, 2003; Lutz & Moukabary, 2004; McHenry & Borisov, 2005). However, the relevant literature strongly emphasizes that PPP has resulted not only in successes but also in failures (e.g., Jones, 2005). The central critical success factor of a PPP is to reconcile the different values and objectives of the participating public and private actors (Pongsiri, 2002); in this direction, it is of critical importance to develop an appropriate regulatory and contractual framework that accomplishes the following:

- provides assurance to the public sector that the PPP operates efficiently and in line with their policy objectives (e.g., economic development, environmental protection, various social policy objectives, etc.) without opportunistic or inappropriate behaviors from the private actors
- provides assurance to the private actors concerning their protection from expropriation, the arbitration of commercial disputes, respect of contractual agreements, and legitimate recovery of costs and profit proportional to the risks undertaken

In general, the whole business model of a PPP is of critical importance for its success. The business-model concept has been created and used in management study and practice as a unifying unit of analysis that incorporates a number of important decision variables and parameters, which are of critical importance for the success of entrepreneurship and business, and for the development of theory in this area (Morris, Schindehutte, & Allen, 2005). Pateli and Giaglis (2004), based on an extensive literature survey, classify the research that has been conducted on e-business models into eight subdomains: definitions, components, taxonomies, conceptual models, design methods and tools, change methodologies, evaluation models, and adoption factors. They also argue that most of this e-business research lies mainly in the first three subdomains (definitions, components, taxonomies), while limited research has been conducted in the other five subdomains.

Historically, the first research stream in this area focused on the clarification of the definition and the components of the business-model concept. There is no generally accepted definition of a business model; in the relevant literature there are many definitions, which can be grouped into three categories according to their basic focus. The first category of definitions focuses mainly on the economic model, that is, how revenue and profits are generated. For example, Stewart and Zhao (2000) define the business model as "a statement of how a firm will make money and sustain its profit stream over time." The second category of definitions focuses on the value created for the customer and on the value-production architecture. For example, Linder and Cantrell (2001) define a business model as "the organization's core logic for creating value." The third category of definitions focuses mainly on the strategic level. For example, Slywotzky (1996) defines a business model as "the totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers and captures profits." Based on a synthesis of existing definitions of business models, Morris et al. (2005) propose the following definition: "A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture and economics are addressed to create sustainable competitive advantage in defined markets."

Other researchers adopt the approach of defining the business-model concept by specifying its primary elements and their interrelations. Characteristic is the approach of Timmers (1998), who defines a business model as "an architecture for the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various actors; and a description of the sources of revenues." In the same line, Weill and Vitale (2001) define a business model as a description of the roles and relationships among a firm's consumers, customers,

allies, and suppliers that identifies the major flows of products, information, and money, and also the major benefits to participants.

Another stream of research in this area is dealing with the identification of emerging e-business models and their classification into taxonomies or generic e-business models. Several taxonomies have been proposed based on different classification criteria and dimensions. Timmers (1998), using the degree of innovation and the functional integration as classification criteria and dimensions, identifies 11 emerging generic e-business models: e-shop, e-procurement, e-auction, e-mall, third-party marketplace, virtual community, value-chain service provider, value-chain integrator, collaboration platform, information brokerage, and trust and other relevant services. Tapscott, Ticoll, & Lowy (2000) introduce the concept of electronic-business webs, which can be considered as fundamental types of e-business models that are differentiated in two primary dimensions: the level of economic control by one of the participating actors and value integration. Based on these dimensions and criteria, the authors identify five fundamental types of electronic-business webs: agora, aggregation, alliance, distributive network, and value chain. Lam and Harrisson-Walker (2003) argue that the main dimensions for classifying e-business models should be associated with their strategic objectives. Using the value-based objectives and the relation objectives as classification dimensions, they group existing e-business models into six basic types: Internet merchants and portals, brokerage networks, Internet promoters, virtual product differentiation, interactive networks, and image building.

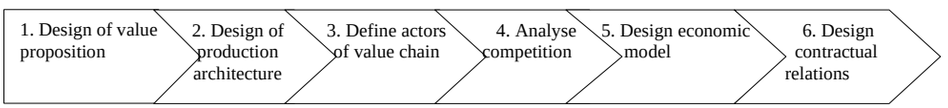
However, limited research has been conducted on the design of e-business models; this limited research focuses on e-business models implemented exclusively by private enterprises. No research has been conducted on the design of PPP business models for offering public electronic services. Morris et al. (2005) proposed an integrated framework for characterizing business models consisting of six significant design decision components (questions to be answered when designing a business model), which are further analysed into subcomponents (subquestions) intended to structure and assist both the description and the design of business models. Also quite interesting is the research work of Shubar and Lechner (2004), which resulted in the IDEA (identify new design possibilities, design new business models, evaluate business models, aggregate to the new value chain) framework for the redesign of existing business models, taking advantage of new technologies; however, the IDEA framework does not support the development of business models from the beginning, but only through the evolution of existing business models, which might result in much less innovative business models.

## A FRAMEWORK FOR PPP E-BUSINESS-MODELS DESIGN

In order to fill the above research gap, we have developed a generic framework for the innovative design of electronic business models, defined as business models aiming at offering electronic informational, communicational, transactional, and other services through various electronic channels, such as the Internet or other fixed or mobile network infrastructures from the beginning without relying on previously existing ones. Also, we have customized this framework for the design of PPP business models aiming at offering electronic services. The objective of the framework is to design the four most important components of the e-business model: the value proposition, value-production architecture, actors, and economic model. The framework consists of six stages, which are shown in Figure 1; their execution should follow an iterative approach so that each iteration takes into account the results of the previous ones and provides a better and more detailed design.

It is assumed that as input we have only a rough and basic description of the electronic service under consideration. In Stage 1, the value proposition is designed. Initially, the targeted segments (user groups) are identified, and for each of them the basic elements of the service (capabilities offered) are defined. For this purpose, with some enhancements, the buyer utility-map framework is used, which has been developed by Chan Kim and Mauborgne (2000) in order to support the design of products and services with high levels of utility. According to this framework, the experience of the user of a product or service is in general created during a cycle consisting of six distinct phases: purchase, delivery, use, supplements, maintenance, and disposal. Moreover, according to this framework, cutting across these phases there are six basic levers of utility, with this term

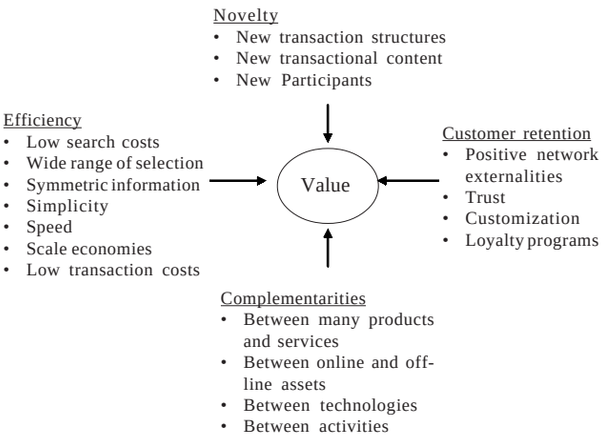
*Figure 1. Stages of the framework for PPP electronic business-models design*



meaning the ways in which we can offer utility to the user of the product or service: increasing user productivity (by offering him or her capabilities for accomplishing a task better and faster), reducing his or her risk, and offering simplicity, convenience, a fun image, and environmental friendliness. Based on the above principles, for the systematic design or improvement of a product or service, we construct a 6x6 table (utility map) with the above six phases horizontally and the above six levers of utility vertically, and we try to fill as many of these cells as possible, and each cell with as many product-service elements and capabilities as possible. In order to make this buyer utility map more appropriate for designing electronic services, we enhanced it by adding to the above buyer experience cycle two additional phases—the phase of search (in the beginning of the cycle before the phase of purchase) and the phase of customization (between the delivery and the use phases)—since, according to the relevant literature (e.g., Amit & Zott, 2001), the most important sources of the value created by electronic channels are the extensive search and customization capabilities they offer. We can use this enhanced buyer utility map for designing the elements and capabilities of the new electronic service, and also for analysing similarly other existing competitive services (electronic or physical) and comparing them with the new service; this comparison may give very useful indications for enriching the utility map of the new service with additional elements and capabilities. In this way, an initial list of the elements of the new service can be developed.

However, in order to exploit to the highest possible extent the capabilities offered by the specific electronic channel for which we design the new service (e.g., the Internet or any other fixed or mobile network infrastructure), we can use additionally a value model of this channel, which incorporates the main sources of value the specific channel can create. For designing Internet-based electronic services, we can use the model of the sources of value creation in Internet e-business developed by Amit and Zott (2001). It has been constructed based on an extensive theoretical background concerning virtual markets, value-chain analysis, Schumpeterian innovation, resource-based view of the firm, strategic networks, and transaction-cost economics, and also on an extensive case study (detailed study of 59 successful public e-business companies from the USA and Europe). This model is shown in Figure 2. According to this model, there are four basic sources of value creation in Internet e-business: efficiency, novelty, complementarities, and customer retention; each of them is also analysed into a number of specific value drivers. For each of the value sources and drivers of such a value model, we try to devise relevant elements of the new service, which are based on this specific value source or drive, and in this way we

*Figure 2. Sources of value creation in Internet e-business*




enrich the above initial list of capabilities of the service. This approach enables us to generate new ideas for innovative capabilities of the new service by exploiting the extensive theoretical background and practical experience incorporated in such value models. Moreover, taking into account the existing public policy objectives and the existing information concerning the value criteria of the targeted segments (user groups) concerning similar services (electronic or physical), we can further enrich the above list of elements of the new service. This final list of elements is examined in order to define which of them constitute basic public services (taking into account the culture and the expectations of the society and the existing public policy objectives) and therefore need special treatment in the PPP contractual agreements (in Stage 6) concerning price, quality, and availability.

In Stage 2, the production architecture is designed, consisting of all the activities that have to be performed in order to deliver the value (i.e., offer all the service elements and capabilities) defined in Stage 1. For the design of the production architecture, we can use the value-chain model of M. Porter (1980, 1985, 1996), which includes five categories of primary activities: inbound logistics, operations, outbound logistics, marketing and sales, and service. We can also use the two additional value-creation configurations that have been proposed by Stabell and Fjeldstad (2001) for analysing complex services: the value shop, which includes five categories of primary activities—problem finding, problem solving, choice of alternative, execution, and control and evaluation—and the value network, which includes three categories of primary activities—network promotion and contract management, service provision, and infrastructure operation. Moreover, for the same purpose, we can use the virtual value-chain model proposed by Rayport

and Sviokla (1995) for analysing the production of information goods, which includes five categories of primary activities: information gathering, organizing, selecting, synthesizing, and distributing. The production architecture of the new service can be based on one of the above models or a combination of them. Its structure can be either the classical linear one (each activity is fed by one previous activity and feeds one following activity) or a network one (some activities can be fed by more than one previous activities and/or feed more than one following activities), taking into account the evolutions that have taken place in several industries from simpler linear structures to complex network structures (Gulati, Nohria, & Zaheer, 2000; Li & Whalley, 2002). The design of the production architecture starts from the value proposition and moves backward. Initially we determine the direct activities required for delivering the value proposition (i.e., offering the service elements and capabilities) defined in the first stage, then for each of them, we determine the direct activities it requires as inputs, and so forth. In this stage, we can also use the value-chain model of Walters and Lancaster (2000) and the strategic value-creation-networks framework of Jarillo (1995).

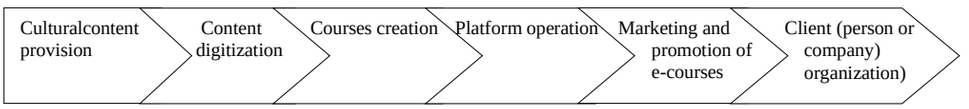
In Stage 3, for each of the value-production activities defined in the second stage, the most suitable actors (i.e., class of private- or public-sector organizations) for executing it are determined based on the resource-based theory (Barney, 1999; Barney, Wright, & Ketchen, 2001) and the framework of Talluri, Baker, and Sarkis (1999). In particular, for each activity the resources and capabilities required for executing it efficiently and effectively, and its critical success factors are determined; based on them, various alternative classes of actors, that is, alternative types of private- or public-sector organizations who could undertake it, are initially identified, and then among them the most appropriate class is selected. In this stage, it is of critical importance to decide for each of the above activities whether it should be undertaken by the public or the private sector, taking into account the strengths, the weaknesses, the resources, and the capabilities of each. It is of critical importance in a PPP to combine properly and leverage the strengths of both the public sector (e.g., higher responsibility and accountability to society) and the private sector (e.g., higher efficiency, technical expertise, etc.). However this decision might have to be reexamined in the light of the results of the fourth stage.

In Stage 4, for each of the activities of the production value chain defined in the second stage, an analysis of the competitive power of the potential actors is performed based on the five-forces framework of M. Porter (1980, 1985, 1996). According to this framework, the competitive power depends on the intensity of the following forces: threat of new entrants, threat of substitutes, bargaining power of suppliers, bargaining power of buyers, and competitive rivalry; a higher intensity of these forces results in lower competitive power. From this analysis, we can identify activities executed by private actors having a very high level of competitive power (e.g., in cases of oligopolies with a small number of possible players, or in cases of high switching costs, etc.) who might dominate in the provision of the service. Such a situation is not acceptable in a PPP, therefore it might possibly necessitate the reconsideration of the decisions of the third or even of the second stage.

In Stage 5, the economic model is designed; that is, it is decided how revenue will be generated from the users of the service or from other sources (e.g., from advertisement, subsidies, etc.). For this purpose, we can take into account the revenue models proposed by Olla and Patel (2002; e.g., flat fee, volume based, per transaction, per message, session based, etc.) in combination with the price corridor model of Chan Kim and Mauborgne (2000). However, for the elements of the service that have been defined in the first stage as basic public services, a different economic model might have to be designed (e.g., with lower prices).

Finally, in Stage 6, the contractual relations among the public and private actors who will participate in the value-production architecture are designed, which according to the relevant literature are of critical importance for the success of the whole PPP due to the different values and objectives of the public and private actors, as mentioned in the previous section. Such PPP contractual relations are usually characterized by high complexity since they should define in detail the rights and the obligations of all involved parties, and also include numerous clauses for possible violations of obligations and corresponding penalties (e.g., if party A violates its obligation OAi, then penalty PAi will be imposed on A, etc.). The design of these contractual relations is based on the $e^3$-value modeling methodology and its extension (Gordjin, 2002; Gordjin & Akkermans, 2003; Kartseva, Gordjin, & Tan, 2004). The basic version of this methodology allows the formal representation of collaborative value creation through the cooperation of several actors who exchange objects of economic value (e.g., products, services, money, etc.) based on a number of basic concepts, such as the actor, value object, value exchange, value interface, dependency path, and so forth (see also Figure 4). In this way, the design and communication of the rights and obligations of each involved party can be supported. Its extension, referred to as $e^3$–value+, allows also the formal representation of subideal situations, in which one of the involved parties violates its obligations (i.e., does not deliver one or more of the value objects it was contractually obliged to deliver to another party); in this way, the design of clauses for possible violations of obligations is supported.

*Figure 3. Production architecture for e-learning of cultural heritage*




## APPLICATION

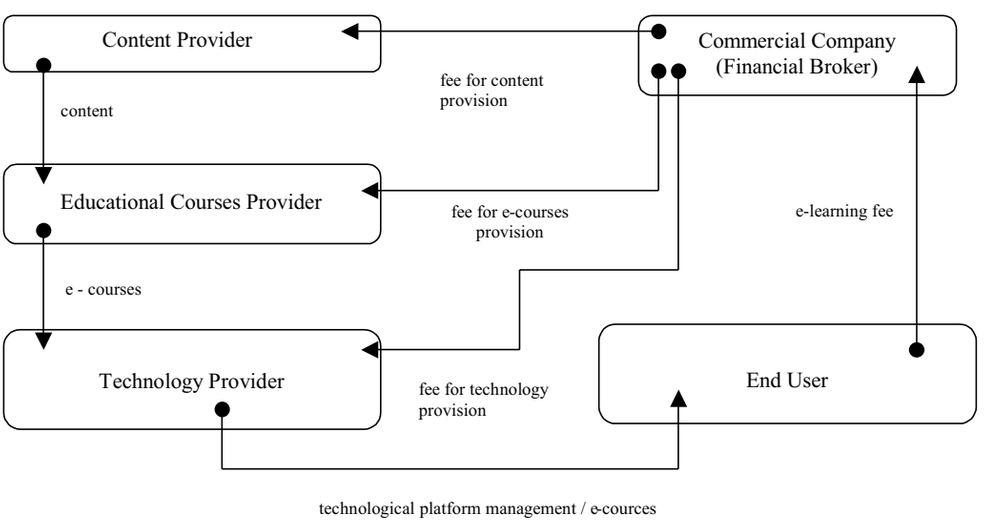
The above framework has been applied for the design of a PPP business model for the electronic provision of cultural-heritage education (e-learning) for the project ERMIONE of the eTEN Program of the European Union (Grant Agreement C517357/2005). The basic objective of this project is to provide all interested persons (e.g., artists, teachers, students, etc.) and cultural and educational institutions in Europe, or even all over the world, with a wide range of high-quality content and training courses about the European cultural heritage, coming from cultural and educational institutions (e.g., museums, collections, libraries, archives, archaeological sites, universities, etc.) dispersed all over Europe. In Figure 3, we can see the corresponding value-production architecture: In order to create e-courses in the domain of cultural heritage, owners of cultural-heritage assets (e.g., museums, collections, libraries, archives, archaeological sites, etc.) initially provide relevant content, which is digitised. This digitised content is then used by educational institutions (e.g., universities) in order to create e-courses. Next, these e-courses are uploaded on an e-learning platform, which is managed by a technology provider. Finally, these e-courses are marketed and promoted by an experienced commercial company.

The corresponding collaborative value-creation model based on the $e^3$-value methodology is shown in Figure 4. We can see the main actors involved in the provision of e-courses in the area of cultural heritage (content provider, educational courses provider, technology provider, and commercial company) and the value objects they exchange.

## FUTURE TRENDS

The need for developing and operating complex informational and transactional e-government services using various electronic channels, such as the Internet or other fixed or mobile networks, will necessitate extensive PPPs in the near future between public organizations of various levels (e.g., municipalities, regions, ministries, etc.) and private organizations of various sectors (e.g., from the ICT industry, banking, etc.). Therefore, it is necessary to develop effective methods for designing systematically and rationally the business models of these PPPs so that they finally offer highly valuable electronic services,

*Figure 4. Collaborative value-creation model for the provision of e-learning in the area of cultural heritage*



combine properly, and leverage strengths of multiple public and private organizations, and at the same time reconcile their different values and objectives; these design methods should combine knowledge from various areas (e.g., management science, public administration, information systems, etc.) and also incorporate the experience gained from previous PPPs, especially from PPPs that enable the provision of electronic services (e.g., basic problems and difficulties, critical success factors, etc.). Also, it is necessary to apply and evaluate such methods in real-life situations so that we can identify their advantages and disadvantages.

## CONCLUSION

In this article, framework for designing PPP business models for the provision of electronic services has been presented. It supports the definition of the value proposition (elements and capabilities of the service), the value-production architecture (activities that have to be preformed in order to provide the service) and the actors who will participate in it (both public and private organizations), the economic model (i.e., how revenue will be generated from the users of the service or other sources), and finally the contractual relations among the actors (rights and obligations of each actor, and clauses concerning possible violations of obligations and corresponding penalties). This framework has been used in order to provide a solid ground for the ERMIONE project of the eTEN Program of the European Union and to design its basic PPP business-model concept. Taking into account the fact that, as mentioned in the previous section, growing PPPs are expected in the near future for the provision of various types of electronic services to citizens and enterprises, such a framework can be very useful for the design of successful PPPs with solid foundations: clear and attractive value propositions, appropriate actors with clear roles and well-defined and fair relations among them, and power balance, avoiding too powerful private players who might cause unacceptable situations and finally degenerate the PPP. Further research is in progress by the authors in order to further elaborate this framework, enrich it with experience gained from existing PPPs for electronic services provision, and also evaluate it in more real-life situations.

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## KEY TERMS

**Business Model:** A concise representation of how an interrelated set of decision variables concerning value proposition, value-production architecture, value-production actors, and economics are addressed, aiming at the introduction and the sustainable success of a product or service.

**Electronic Business Model:** A business model aiming at offering electronic informational, communicational,

transactional, and other services through electronic channels, such the Internet and other fixed or mobile network infrastructures.

**Electronic Learning (E-Learning):** The use of information and communication technologies for the creation of enhanced learning experiences, aiming at improving the knowledge and skills and/or changing the attitudes of a target group on a specific topic.

**Public-Private Partnership (PPP):** "An institutionalized form of cooperation of public and private actors, which, on the basis of their own indigenous objectives, work together towards a joint target" through "leveraging joint resources and capitalizing on the respective competences and strengths of the public and private partners" (Jamali, 2004, p. 416).

**Value Model of an Electronic Channel:** The main sources of value that a specific electronic channel can create (i.e., ways to create value using this electronic channel); for example, for the case of the Internet, the main sources of value are efficiency, novelty, complementarities, and customer retention.

**Value-Production Architecture:** A set of activities that have to be performed in order to deliver a value proposition (i.e., offer a predefined set of service elements and capabilities); its structure can be either linear (each activity is fed by one previous activity and feeds one following activity) or network based (some activities are fed by more than one previous activities and/or feed more than one following activities).

**Value Proposition (of an Electronic Service):** The set of useful elements of the service (i.e., the set of useful capabilities offered to the users).

# Electronic Campaign Finance Reform in the American States

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## INTRODUCTION

With every new election cycle in the United States, there is a call for campaign finance reform. These regulations have come in a variety of forms, each having the goal of rebuilding trust in the voting system and government in addition to regulating election finance. With an eye toward building trust, beginning in the early 1990s, state (as well as local and federal) campaign finance regulatory agencies started implementing campaign reporting procedures that required either the replacement or augmentation of paper filing systems with electronic systems. It is hoped that these new procedures will make summaries and analyses of contributions and expenditures more easily accessible to the public as well as to government watch dogs such as interest groups and the media.

The adoption of these electronic reforms (e-disclosure laws) is representative of a public service trend in the United States. Over the last several years, federal, state, and municipal governments have moved increasingly toward government adoption of electronic government (e-government) practices that "refer to the delivery of information and services via the Internet or other digital means" (West, 2004, p. 2). Each of the 50 states has implemented some type of e-government, and the federal government has created a central portal for federal services (West, 2003).

This trend toward adopting e-government has not taken place without comment; it has been accompanied by speculation of the impact to both citizens and government units alike. It has been argued that because e-government can deliver services and information around the clock, it may make government more efficient and transparent to the public (Norris, 2001; West, 2003). It also has been suggested that it will make government more responsive to the public through its ability to provide communication options that are quicker and more convenient for users (Thomas & Streib, 2003). Furthermore, an online presence may reduce government costs and allows the timely update of materials and information more quickly than in traditional distribution methods (Pardo, 2000). Others (Jaeger & Thompson, 2004; Pardo, 2000) argue that e-government has the ability to increase political engagement and to create a more participatory democracy. These benefits may increase the likelihood that Internet-based reforms have a greater likelihood of adoption. Interest groups who campaign for electronic disclosure laws in order to reduce corruption and to increase transparency may find themselves aided by public administrators attracted to the cost-cutting promises of e-government.

## BACKGROUND

Since U.S. states vary substantially in election activities, they have used different approaches in an attempt to regulate campaign finance. There are a number of factors, including geographical area, party balance, inter-party competition, interest group organizational strength, legislative professionalism, term limits, and use of the initiative process, that determine what type of campaign finance laws are needed (Thompson & Moncrief, 1998). Given this wide scope of factors, many different scenarios have been played out. Nevertheless, the overall trend shows that states have moved to stricter laws than the federal government has (Drage, 2000).

Adoption of campaign finance reform at the state level parallels that of the federal level. When the U.S. national government initiated reforms in the late 1800s, the states followed suit. New York in 1890, Massachusetts in 1892, and California in 1893 passed disclosure requirements for both money receipts and expenditures. A number of states during this time period also passed laws banning contributions from certain industries such as banking and insurance (Center for Responsive Politics, 2000).

Just as with the federal government, there was a substantial push for reform at the beginning of the Progressive Era (late 1800s to early 1900s), and then enthusiasm for policy adoption dissipated. It would take until the early 1970s, when the public expressed extreme out-

rage over Watergate, to refocus both federal and state attentions on campaign finance laws. In 49 of the 50 states, legislatures responded by implementing reforms. Even so, the laws passed were far from standard and varied in their effectiveness. Most reforms were not accompanied by adequate funds in order to sufficiently enforce them (Center for Responsive Politics, 2000).

In the last three decades, campaign finance reform has been an active area for legislation at the state level. Recent state efforts have focused on lowering contribution limits, increasing disclosure requirements, and public financing of campaigns. Of these various reform measures, increased disclosure requirements have become the most prevalent. Twelve states passed legislations mandating electronic filing of and access to campaign finance information for the 2000 elections. In 1997, 15 states passed laws facilitating electronic filing, and seven states followed in 1998. Many of these programs were voluntary. When California initiated its electronic disclosure policy in July 2000, for example, only candidates and committees connected with a campaign for state office that received more than $50,000 in contributions were required to file electronically (Drage, 2000).

By 2003, only four states (Montana, South Carolina, Tennessee, and Wyoming) did not have some form of computer-aided filing system for campaign finance, lobbyists, or personal financial disclosure statements. Although most states have some electronic filing requirements, the implementation and scope of these laws vary considerably across the states. While many states require lobbyists and candidates to file their financial information online, others require financial statements to be reported using standard paper forms, but then the information is uploaded online. In Alabama, Arkansas, Mississippi, South Dakota, Vermont, and West Virginia, paper financial statements are scanned and posted online. In Delaware, Kansas, and North Dakota, the data from paper financial statements are entered manually and then posted on the Web (Center for Government Studies, 2002).

In addition to varying on how campaign finance information is posted online, the states also differ with respect to what information is provided. By 2003, the number of states requiring both the occupation and employer of donors to be listed had risen to 29; five required only the employer, while two asked only for the occupation. The remaining states did not require either occupation or employer information. While 40 states require expenditures either for or against a candidate to be disclosed, only 23 states require expenditures made close to the election to be posted before the election. Finally, only 27 state Web sites provide databases for campaign contributions, while 17 offer databases on expenditures (Campaign Disclosure Project, 2003).

## THE IMPLEMENTATION OF POLICY

What factors explain the extent and variation of implementation of electronic disclosure initiatives in the states? Policy literature suggests that politics, public demand, and government resources are important determinants of policy variation (Mooney & Lee, 1995). These factors differ in importance, depending on the type of policy. The factors associated with adoption of electronic campaign finance laws are difficult to predict, because this reform does not fall neatly into any existing policy typology. Electronic campaign finance reform can be conceptualized as both administrative (procedural) reform policy and as regulatory policy. Regulatory policy involves the government enforcing rules of conduct directed at specific groups or individuals, while administrative rules dictate how policy is carried out. The adoption of these two forms of policy is driven by different factors. McNeal, Tolbert, Mossberger, and Dotterweich (2003) found that when e-government is adopted as an administrative reform, it often is driven by the goals of cost reduction and increasing efficiency. Unlike regulatory policy, it does not involve the direct and coercive use of government power over citizens and is not very salient among the public. On the other hand, implementation of regulatory policy is highly volatile and controversial (Ripley & Franklin, 1980).

McNeal, et al. (2003) found that instead of being driven by political forces, administrative policies largely are driven by professional networks. More generally, research has long shown that professional networks of generalists (e.g., governors and legislators) and specialists within state agencies influence innovation and diffusion (Walker, 1969, 1971; Grupp & Richards, 1975). This exchange of experiences and information between networks of innovators and potential adopters is at the heart of policy diffusion (Rogers, 1995).

Because electronic campaign finance reforms represent both regulatory and administrative policy, it is likely that both interest group activities and professional networks would influence adoption and implementation of the policy. Regulatory aspects of state campaign finance reforms are likely to engage affected interest groups in government such as the National Council of State Legislatures. It also would be expected to connect with good government groups and civil rights organizations that have been leaders in campaign finance reform in the U.S. Normally, their role would be more political than the organizations of state professionals. Campaign finance reform policy might prove to be an exception to this rule, because in this circumstance, organizations of state professionals represent one of the affected interest groups.

Additionally, groups normally not associated with campaign finance reform have become involved with the

policy area. The involvement of these groups can be attributed to entrepreneur efforts. One such policy entrepreneur is Randy Kehler, a founder of the nuclear-freeze movement. He took up the fight for campaign finance reform after becoming frustrated when every attempt to get the issue passed into law was blocked by Congress, despite overwhelming public support for a nuclear-freeze policy. He concluded that money (not public opinion) was the deciding factor in legislation. As a result, in 1989, he formed the Working Group on Electoral Democracy (WGED) in order to push for campaign finance reform. His group began looking at the campaign financial records for every state and worked to match donors with politicians and voting records. In 1993, the group released a series of reports that showed the influence of money in state elections. These reports helped to mobilize a number of organizations to participate in the fight for electoral reform. These groups included a number of environmental organizations, lesbian and gay rights groups, feminist organizations, peace groups, and AARP—groups that initially had not considered campaign finance an issue that was relevant to them. The message used to bring other groups into the fight was that before any other kind of change can become a reality, campaign finance policies must be strengthened (Orlando, 2000).

The literature suggests that actors with different motives were involved initially with the adoption of electronic campaign finance reforms. There were administrators who pushed for e-government procedure in an attempt to increase efficiency and to cut costs and interest groups who were hoping for increased transparency and reduced corruption. However, passing policy into law is not the same as implementing it. Mossberger, Tolbert, and McNeal (2005) found that states who were early to initiate e-government rules did not necessarily remain innovators in this policy area. They found that while cost cutting was a motive for many states to adopt e-government measures, only states with resources to invest in the necessary technical capacity and infrastructure were able to continue to maintain and innovate these procedures over time.

Although there is extensive literature on policy adoption and implementation, there is little that specifically examines the adoption of campaign finance reform. Ironically, this has been the result of inconsistent state policy in the disclosure of campaign finance information. After examining state campaign finance laws for possible trends, Sorauf (1988) concluded that the only detectable trends were a few regional patterns. These findings were attributed to very poor data collection methods at the state level and no scientific or journalistic effort to examine the topic. Hogan (2000) echoed the same concerns. He undertook a study to determine the factors that influence the costs of state elections and noted that data collection was the most difficult aspect of his research.

Even though there is limited policy research on campaign finance policies at the state level, the increased availability of campaign finance information on the Internet is changing this. Recently, McNeal, and Schmeida (2005) lent support to the adoption and implementation literature with their research on the implementation of electronic campaign finance disclosure laws. As predicted, they found that interest group activities influence the presence of electronic disclosure policy. Their research also indicated that state resources were positively related with the scope of implementation of these policies. This finding is not surprising. In their 1999 study of e-disclosure implementation, the California Voter Foundation (1999) discovered that in a number of states, e-disclosure laws had not been implemented, even though such a policy had been passed several years previously. In each case, the problem appeared to be financial; they simply could not afford the necessary infrastructure.

## FUTURE TRENDS

There are factors to consider when predicting the future of electronic campaign finance disclosure policy in the U.S. The first is its history of campaign finance reform. For much of its history, there have been only incremental changes in this policy area. The exceptions were during the Progressive Era and the 1970s, when there was a flurry of legislation and dramatic changes in campaign finance reform. A number of factors worked in conjunction to bring this about, but the most important elements were scandal and the media. During the Progressive Era, the elements of scandal were provided by the party machines that dominated politics at that time, and during the 1970s, it was Watergate. Both received considerable media coverage. During the Progressive Era, media attention was supported by new technical advances such as photography and muckraking journalism, crusading journalism during this period that was focused on the exposure of corruption in industry and business (Davis, 1994). In general, the adoption of campaign finance reform in the United States follows a trend of long periods of incremental change with occasional periods characterized by a flood of legislation and significant policy changes.

A second factor to consider is the rate and extent to which e-government is being adopted. In the United States, the impetus behind the adoption of e-government is cost cutting and efficiency. This is a result of e-government being promoted in the mid-1990s by the Clinton administration as part of its effort to reinvent government. In other countries, a pattern of policy adoption has been somewhat different, with e-government

being touted as new public management reforms or as a means of increasing political participation (Chadwick & May, 2003; Fountain, 2001).

There is evidence that following the initial enthusiasm to jump on the cost-cutting bandwagon of e-government, the US has continued to make inroads in adopting e-government practices. West (2005) has methodically analyzed Web sites for all 50 states since 2000 and has found considerable technical development among the states with advances in areas such as online security and conducting online transactions. Nevertheless, the greatest use of e-government is still that which requires the least technical infrastructure: posting information. As illustrated by the inability of some states to implement required e-disclosure laws, financial and technical roadblocks are slowing the spread of e-government practices. Although there is both interest groups and administrative impetuses for adopting e-disclosure laws, these barriers may mean that the implementation of this policy area, like most campaign finance reforms, is more incremental then dynamic.

## CONCLUSION

There is a long history that suggests that scandal and media attention act as catalysts to the adoption of campaign finance reform in the United States. The Internet has added supplementary motives when reform also can be regarded as an e-government measure. There are now different forces inside and outside of state governments that influence the adoption of electronic campaign finance reforms. Administrators often work to adopt e-government procedures in order to reduce costs and increase efficiency, while interest groups have crusaded for more stringent disclosure laws in order to increase transparency and to reduce corruption. The addition of administrative support may help to overcome the barriers associated with the reluctance of decision makers to pass laws that are not in their own best interests.

Although the adoptions of these laws have attracted the support of actors with varying motives, this does not guarantee their success. E-government literature and the history of electronic campaign finance disclosure laws suggest that successful implementation requires governments to have the necessary resources to invest in the technical capacity and the infrastructure to maintain this policy. This suggests that in the short run, the requirement of significant infrastructure may negate the additional support of cost-cutting administrators brought to the battle over campaign finance reform.

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## KEY TERMS

**Electronic Campaign Finance Disclosure Laws:** Campaign-reporting procedures require either the replacement or augmentation of paper filing systems with electronic systems.

**Electronic Government:** The delivery by government of information and other services by electronic means such as the Internet.

**Electronic Government as an Administrative Reform:** E-government services that facilitate communication between government and citizens and whose adoption often is driven by the goals of cost reduction and increasing efficiency.

**Muckraking Journalism:** A form of crusading journalism that was focused on the exposure of corruption in industry and business. This form of journalism was prominent during the Progressive Era and aided the movement's efforts to reform government.

**Policy Entrepreneur:** An individual who, acting in a leadership capacity, invests considerable time, money, and effort into the passage of a particular policy issue.

**Regulatory Policy:** Public policy that involves the government's enforcing of rules of conduct directed at specific groups or individuals. This type of government action involves the coercive use of government power over citizens and is very salient among the public.

**Working Group on Electoral Democracy (WGED):** A group formed in 1989 by Randy Kehler, a founder of the nuclear-freeze movement. This campaigned finance reform group worked to mobilize other organizations through the use of public campaign financial reports to show linkage between money and public policy adoption.

# Electronic Governance



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## INTRODUCTION

Two parallel evolutions are currently challenging the functioning and the legitimation of the traditional nation-state: globalization and the rapid development of the information and communication technologies (ICTs). Both come together in the new concept of "electronic governance" or "e-governance." Indeed, globalization in all its forms (i.e., financial, economic, cultural, technological, and ecological globalizations) is increasingly putting pressure upon the nation-state. Collective problems, such as climate change or organized crime, can no longer be solved by nation-states only, let alone by one single nation-state. In fact, such problems require not only the supra-national approaches and institutions, but also the involvement of non-state actors, in particular of civil society and the private sector. Simultaneously, the ICTs are gradually penetrating all realms and all levels of society, and as such increasingly affect both production processes and state-society transactions.

If "governance" can be defined as the growing involvement of non-state actors into collective problem-solving at all levels of society (i.e., from the local to the global levels) (e.g., Finger, 2004; Mayntz, 1999), "e-governance" then means the active usage of the ICTs for such collective problem solving. In this article we want to both offer an understanding what e-governance is and could be and outline of the different dimensions and forces which currently lead up to e-governance practices. Consequently, our article is structured as follows: in a first section, we will present and critically discuss the state of the literature on e-governance. In a second section, then, we will show how governance and the ICTs are currently coming together, and subsequently propose a definition of electronic governance.

## BACKGROUND: A CRITICAL OVERVIEW OF THE LITERATURE

If one critically examines the quite recent literature on e-governance, one can identify three different approaches, each coming to e-governance from a different perspective, namely (1) from a public sector reform perspective and (2) from a governance perspective.

### E-Governance through the Lens of Government

As a matter of fact, most of the currently available literature on e-governance is rooted in ICT-driven government reform projects. Here, the ICTs are used to increase operational efficiency and at times a better customer-orientation (Cluff, 2002; Marche & McNiven, 2003; Prattipati, 2003; Schedler, Summermatter, & Schmid,, 2004; Turner, 2002;). As a result, the words e-government and e-governance are used almost synonymously. For other scholars, e-governance means the utilization of ICT to improve democratic processes at the various levels of political activity in a state (Macintosh, 2004; Pratchett & Lowndes 2004; Christin & Trechsel, 2004). This is also referred to as e-democracy, and refers to use of ICTs in (any) democratic process (e.g., Grönlund 2002; Malkia et al. 2004) (i.e., consultations, participation, and policy making). However, among politicians only the voting part was taken up as they wanted a quick fix to the decreasing turnout at elections. Hence, also in the EU, e-democracy means e-voting.

The application of ICT in the area of government and politics is considered to have a transformative impact on the existing structures of the state, the legal system and the functioning of government in general, in that processes and transactions are becoming more efficient and more transparent, and that overall citizens are better served (Mälkiä et al., 2004; Zwahr, Finger, & Müller, 2005). Another stream of research that looks at the transformative aspects of e-governance is research in digital government. It examines the impact of ICT on government institutions, its governance structures and information processing (Fortes 2003; Fountain, 2001, 2003).

### E-Governance through the Lens of Governance

Globalization is without doubt one of the buzzwords of the late 20th and the early 21st centuries and is considered to

bring both successes for national economies as well as an increasing external pressure on the nation-state. States aim at participating in the global process of communication and trade on the one hand, but are on the other hand limited to their national institutions, especially in the fields of fiscal, economic, and social policy. Yet, new collective problems of global (i.e., transnational) nature emerge, such as for example climate change, unemployment, or pollution problems. These problems can no longer be solved by a single nation-state alone. Moreover, such problems affect numerous stakeholders at all levels of society (i.e., from local to global) and as such can only be solved in a joint effort among all stakeholders (Beisheim et al. 1999; Mayntz, 2002). Thus, in the context of globalization, states increasingly need to share their power with other actors, be they from the private (businesses, business organizations) or the third sectors (civil society, non-governmental organizations). The fact that the state is no longer powerful enough to impose its solution thus is characteristic of the passage from government to governance (Finger, 2002, 2003).

On the level of firms, the situation is actually similar. Embedded in a national economy, firms are increasingly engaging on global markets. In this process, multi-national firms are exposed to new economic challenges and political environments which they have to cope with. Furthermore, the influence of external interest groups such as unions or non-governmental organization is shaping the decision-making process of firms. Decision making and corporate governance in and of firms is thus more and more incorporating the interests of external stakeholders and interest groups (Greenwood & Jacek, 2000; Ronit & Schneider, 2000). In the firm also, we are moving from traditional top-down government (shareholder value) to governance (stakeholder value).

In both cases, the literature on e-governance is exploring the role of the ICTs when it comes to solving either collective or corporate problems (Finger & Pécoud, 2003). Examples of such research are the investigation of e-participation systems in Europe or the study of ICT based citizen involvement in public and corporate decision-making (Bishop, Kane, & Patapan, 2002; Womenspace, 2003).

### Critical Analysis

In short, both approaches acknowledge that there is a strong relation between the utilization of the ICTs and governance. In the case of "government governance," the major concern is the optimization of traditional government processes (performance optimization: efficiency and effectiveness). However, they are not concerned with the transformative impact the ICTs can have on the overall politico-administrative system. Often, the term e-governance is simply used as a substitute for e-government, which actually describes much better what these authors have in mind. The stream of literature that is concerned with the transformation of the nation-state and the firm, is much more interested in the transformative role of the ICTs, yet this research is so far only little advanced.

## THEORETICAL CONSIDERATIONS ON E-GOVERNANCE

One must acknowledge that there are indeed currently totally separate schools of thought which come together in the concept of e-governance. In this section, we try to integrate these schools of thought by starting out with governance and integrating in there the ICTs.

### From Government to Governance

In order to understand the evolution of the recent years from government to governance, one has to recall the main functions a state generally performs, namely policy making, service delivery, and regulation. Policy-making refers to the process of developing policies in either a state or a firm. A national public policy might be that each citizen has the right to receive a basic healthcare service. In a firm, a corporate policy can be that enterprise resource planning is done with only one specific type of software. The process of how such a policy is developed, debated, and finally implemented is all part of policy-making. The service delivery function comprises all activities involved in providing a service. In the case of states, the provision of basic healthcare is a public service, while it is a firm's core business to produce goods and services. The third function, regulation, represents the controlling activities that need to be performed in order to ensure that services are delivered properly, particularly according to the agreed policies.

While all three functions remain necessary in both states and firms, it becomes less and less obvious, over time, that all these functions are performed within the state or the firm. Indeed, the phenomenon of governance precisely highlights the fact that other—non-state or non-firm—actors are increasingly involved in performing these functions. This has become particularly visible in the case of the policy-making function, where non-state actors (businesses and non-governmental organizations) are now actively involved in shaping state policies, while at the firm level all kinds of stakeholders (as opposed to shareholders) increasingly have their say in company policy. Similarly, the service delivery function is increasingly being outsourced (and even privatized in the case of the public sector). Here too, non-state and non-firm actors increasingly come to play a

*Table 1. The role of ICTs*

| | |
|---|---|
| Mirroring | The ICTs are utilized to mirror an existing physical processes or structures (e.g., a production process or an organizational structure) into an electronic model of the physical environment. In doing so, the complexity of the system is reduced and the logical relations between the actors are becoming more transparent. The electronic model is used to create new knowledge about the functioning of the physical environment. This can, for example, be the identification of the financial flows or the discovery of the power relationships among. |
| Steering and Controlling | As a result of the knowledge which has been created through this mirroring process, the physical environment can now be better manipulated. Such intervention can be either an organizational change or even the substation of the physical process or structure by an ICT system. |

role. And even in the case of the regulatory functions non-state and non-firm actors not only emerge but increasingly become powerful. Furthermore, and not astonishingly, this evolution from government to governance is accompanied by a process of multiplication of levels, where the functions are performed simultaneously at the local, the regional, the national, and the global levels by actors who can be themselves local, regional, national, and global.

## The Transformative Role of the ICTs

ICTs are not an end in themselves. As such, the ICTs, in the above passage from government to governance, mainly contribute to improve processes and operational effectiveness. However, this is perhaps a too neutral view of the roles ICTs play. Indeed, scholars have shown, for example, that the use of ICT can lead to a creative destruction of traditional organizational forms and gives rise to new forms of organizing economic activities (Tucci et al., 2003). As such, the role played by the ICTs can be both positive and negative. In firms, for example, an emerging trend is the use of business intelligence systems so as to improve governance processes. In government agencies, web-based technologies are applied to increase operational performance, such as process optimization, or even to support public service delivery (Schedler, Summermatter, & Schmidt, 2003).

A more systematic analysis of the roles played by the ICTs in organizations and institutions shows that they have mainly two functions (i.e., mirroring and steering/controlling), whereas the second builds on the first (Applegate, 2002; Renken, 2004).

# CONCLUSION: INTEGRATING ICT INTO GOVERNANCE

We can now easily see how the two evolutions–the increasingly transformative role of the ICTs and the transformation from government to governance in both states and firms–can be combined into the current concept and practice of e-governance. Consequently, the question is how the ICTs can be used for collective problem solving in complex organizations and institutions (i.e., governance systems), involving states, firms, and civil society and taking place simultaneously at local, regional, national, and global levels. Furthermore, one can break down such governance into the policy-making, the service delivery, and the regulatory functions.

This definition of e-governance opens of course significant new possibilities for research. For example, one may study how, at the firm level, the ICTs affect corporate governance practices, or how they are being used for regulatory purposes. Also, one may want to examine how the ICTs are used by external interests groups who want to gain influence on decision or policy making within the firm. In the case of the public sector, one may want to study the role played by the ICTs in coordinating the various levels of governance in a given area (e.g., air transport).

Examples of current e-governance practices can be found both in the private and in the public sector. Let us briefly outline a current example of e-governance in the in the traditional network industries.

In the postal sector, the final delivery of standard mail is, in many countries, still a monopoly of the sector incumbents. Liberalization efforts are failing because the incentives to infuse competition are too low. Regulation is one function of governance and market creation is a means to regulate the liberalization process in the postal sector. While the creation of markets is being very effective in other sections of the postal value chain, the liberalization of the final mail delivery is posing a significant problem. The problem is due to the universal service obligation of the operator, and thus hinders new entrants to compete on this level of the value chain. Furthermore, this obligation has created several administrative obstacles for market creation, such as cross-subsidizations or non-neutral funding of incumbents (OECD, 2004). This situation represents a governance challenges, because it involves both the states and the firms and is taking place simultaneously at various political levels. Furthermore, the question of how to infuse competition

into the final delivery of mail can be broken down into the policy-making, the service delivery, and the regulatory function of governance. One approach to the resolution of the problem might be the transformation of the final mail delivery from physical to electronic mail delivery. In doing so, coordination and expensive transportation costs can be reduced. The attractiveness for new operators to compete is thus increasing. As a result, in the postal delivery as well as in policy-making and the regulatory function, a significant impact can be achieved through the application of e-governance.

Overall, e-governance thus characterizes an evolution by which the ICTs are increasingly used to support governance mechanisms at all levels, involving all types of actors, and all governance functions. While this will become a growing field of practice, the role of academia will be to develop the theories and concepts that must underlay such practices.

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## KEY TERMS

**Electronic Governance:** The active use of the information and communication technologies for collective problem-solving at various political levels involving State and non-State actors.

**Governance:** The growing involvement of non-State actors in collective problem-solving; the multiplication of political levels at which such collective problem-solving occurs.

**ICT:** Information and communication technology.

**Network Industry:** Industry that is dependent on physical infrastructures, such as the postal or the telecommunications industry.

**Policy Making:** Policy-making refers to the process of developing policies in either a state or a firm.

**Regulation:** Represents the controlling activities that need to be performed in order to ensure that services are delivered properly, particularly according to the agreed policies.

**Service Delivery:** A process that comprises all activities involved in providing a service to somebody.

# Electronic Government

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## INTRODUCTION

Digital government, electronic government, online government, wired government, virtual government—there are many terms used to refer to the contemporary strong focus, in practice as in research, on increasing the amount and sophistication of information and communication technologies (ICT) use in government and governance processes. While the terms are largely used as synonyms, there is no unambiguous definition of the field. Some use the terms to refer specifically to government services to citizens (G2C), but definitions by influential actors typically define electronic government in governance terms. The former definitions typically focus on efficiency issues, often directly concerning the ICT components, while the latter ones concern effectiveness and focus on systems aspects, organizations, and social systems in general, rather than individual components. While reduced cost per delivered form is a typical measurement emanating from research following from the first kind of definition, reduced corruption is one from the latter. This article investigates the content of the electronic government (e-gov) field briefly by exhibiting (1) definitions, theoretically anchored ones as well as definitions-in-use emerging from practice, (2) examples of work, including steps in the development over time, (3) models for evaluation, and (4) considerations about the future of the phenomenon based on the development so far. Altogether this gives a view of a vast field, not unequivocally defined but in practice framed by a number of similar practices, strategies, critical issues, and technologies. It is also regularly monitored globally by methods commonly used. While these are not uncontested and subject to different technical, social, and business-oriented viewpoints, they do contribute to the framing of the field as a practice.

## BACKGROUND

The term *e-gov*, as well as the synonyms mentioned in the previous section, emerged in the late 1990s, but the history of ICT use in government organizations can be traced back to the beginnings of computer history. A scientific literature on "IT in government" goes back to the 1970s (Danziger & Andersen, 2002; Kraemer et al., 1978). This literature concerns Information Technologies (IT) use within government, while the recent e-gov literature often concerns external use, such as services to the citizens (Ho, 2002). More recently, picking up the discussion in the Internet era, there are some classics, including Bellamy and Taylor's (1998) *Governing in the Information Age* and Tsagarousianou (1998) *Cyberdemocracy*. The first textbook to use the term *electronic government* was *Electronic Government: Design, Applications and Management* (Grönlund, 2002), and the latest, as of this writing, is *Implementing and Managing eGovernment* (Heeks, 2005). The differences between the two in terms of the underlying empirical material is a telling story about how rapidly the field of practice has evolved over just a few years. In early 2000 there were very few cases; today they abound. Yet, as Grönlund (2004, 2005b) shows, research is still much about storytelling and "lessons learned", and little about theory testing and theory development.

E-gov started as a practitioner field, basically convening practitioners struggling to meet the new challenges of the Internet medium by implementing new systems creatively. If a single event should be pinpointed as a starting point it would be the U.S. National Performance Review, started in 1993, which placed a strong emphasis on the role of e-government in federal services (Gore, 1993; Salem, 2003). Led by then Vice President Gore, strongly coupled to the Clinton administration's strong focus on improved economy, it was given a high profile and relied heavily on the then new Internet technology with the effect of policy and technology mutually promoting each other.

While there are several terms, many largely refer to the same phenomena and are used interchangeably, such as *digital* and *electronic* government. In the following the term *e-gov* will be used simply because it is short and, together with the complete version *e-government* most commonly used, as Table 1 shows. A further note to the table data is that "governance" also returns a large number of hits.

The fact that the terms in Table 1 are commonly used as synonyms does not mean, however, that there is an unambiguous definition. There are both wide and narrow definitions. Government and governance are generally used confusingly in research. There is also some confusion over whether "electronic democracy" should be included or be seen as a separate field. Shared by all

*Table 1. Occurrences of commonly used terms. The search was made at Alta Vista on August 4, 2005. The search was made for the phrase, not separate terms (e.g., "electronic government"). The search was made using the "site collapse" function, which means that a maximum of two pages per site are displayed.*

| Area | Search term | Occurrences |
|---|---|---|
| Government | E-government | 9,460,000 |
| | E-gov | 3,010,000 |
| | Electronic government | 843,000 |
| | Online government | 601,000 |
| | Digital government | 425,000 |
| | Virtual government | 42,000 |
| | Wired government | 3,470 |
| Governance | E-governance | 531,000 |
| | Electronic governance | 47,800 |
| | Digital governance | 9,900 |

definitions is that e-gov includes a comprehensive strategic approach to government organization rather than piecemeal automation of discrete functions.

E-gov can be defined theoretically by setting "visions", operationally guiding definitions based on some theory, or by inducing from ongoing activities arriving at descriptive definition. Below we give examples of both.

## DESCRIPTIVE DEFINITIONS

Defining the e-gov field inductively can be done in different ways. Grant and Chau (2005) offer a framework designed to be generic, not country-specific, containing five categories based on a comprehensive review of events in the field of practice (p. 18):

1. Service delivery (service automation and information, interactive services, CRM—customer/citizen relations management);
2. Citizen empowerment (e-participation/democracy, collaboration/partnerships, CRM)
3. Market enhancement and development (collaboration/partnerships, globalization)
4. Exposure and outreach (globalization, marketing e-gov)
5. Infrastructure consolidation and standardization

Another way of inductively defining the field is to directly use researchers' and practitioners' categories which can be found in calls for papers and proceedings from the multitude of e-gov conferences. These tend to emphasize critical issues rather than just activities. For example, there is less about exposure and outreach and more about security, trust, knowledge management, and reorganization. Table 2 shows one example, which, although only one sample, is quite illuminating as it comes from one of the largest e-gov conferences attracting both researchers and practitioners, and the list of topics is quite similar to other conferences in the field.

*Table 2. Call for Papers for DEXA EGOV 2005 (Source: http://falcon.ifs.uni-linz.ac.at/news/cfp_e-Government2005.html)*

| |
|---|
| 1. Frameworks and guidelines for e-government and e-governance |
| 2. E-government policies, strategies and implementation |
| 3. Methods and tools for e-government research |
| 4. Participation, e-democracy and e-voting |
| 5. One-stop government, electronic service delivery, mobile services |
| 6. International and regional projects, case studies and best practice |
| 7. Administrative process design and change, collaborative activities, legal interpretation |
| 8. Trust and security: provisions and instruments |
| 9. Knowledge management, public information, decision process support |
| 10. Interoperability and standards, semantic standardization |
| 11. Change management and new organizational arrangements: public-private-partnerships, virtual teams |
| 12. Legal, societal and cultural aspects of e-government |
| 13. International dimensions: cooperation, comparisons, networks |
| 14. Teaching e-government |

The difference between these two ways of framing e-gov points to the problem with inductive definitions: they tend to focus on what has happened, not what will happen. In that sense the DEXA EGOV list may be more accurate as research observes problems in current practice and are interested in finding solutions.

Categorizations can also be done at different levels of granularity. While the DEXA categories are rather specific, Andersen and Henriksen (2004) investigate 110 e-government journal papers and find four general themes pertaining to how ICT use affects the role of government:

1. Conceptualization of e-government,
2. The governmental role in technology diffusion,
3. A governmental administrative e-service focus, and
4. Democracy and involvement of citizens.

Another attempt in a similar vein is made by Grönlund (2005) who relates conference papers to various aspects of governance (Table 3). One hundred seventy papers from three major e-gov conferences were classified by title, keywords, and contents into several themes. These themes are associated with four important aspects of governance and government:

1. A systems Perspective: all government agencies together rather than individual organizations or subsets of government organizations (an efficiency perspective)
2. The governance system (an effectiveness perspective)
3. Social aspects
4. The relation between government and citizens

As this brief review shows, inductively constructed definitions reveal e-gov as a large practice with many topics but leave us wanting as for the thrust of the field. Why has *e-gov* emerged as the umbrella term for all these very different subfields included? To answer that question we now turn to theoretically motivated definitions.

*Table 3. Research themes aggregated from three major e-gov conferences in 2003: DEXA EGOV, HICSS (Hawaii International Conference on Systems Sciences), and ECEG (European Conference on Electronic Government) (Grönlund, 2005)*

| Fields | Themes |
|---|---|
| **Government in a systems perspective: all government organizations together** | Reorganization |
| | Infrastructure |
| | Efficiency, rationalization |
| | Self-service |
| | E-commerce-inspired systems |
| | Interoperability |
| | Standards |
| | Ontologies |
| | Change management |
| | Legal environment |
| | Process management/process remodeling |
| **The governance system** | Outsourcing |
| | Value-added services by third parties |
| | Virtual communities |
| | Community network |
| **Social aspects of e-gov: "Society, the home of all people"** | Universal access |
| | Design for all |
| | (Bridging) digital divides |
| | E-democracy |
| | Participation |
| **The relation between government and governed** | User value/citizen satisfaction |
| | Societal value (effectiveness) |
| | CRM |
| | Call centers/service centers |
| | The role of civil servants |
| | Governing the Internet |
| | E-service models, government business models |
| | Voting |
| | Control, security, surveillance, privacy |

## THEORETICALLY MOTIVATED DEFINITIONS

Around the turn of the millennium, governments across the globe set up definitions of electronic government as foundations for national strategies to achieve excellence based on use of Internet technology. The general theory behind all these are that ICT can contribute to a number of advantages, both for governments and users/citizens. This theory may certainly be contested (Scholl, 2005), and closer scrutiny reveals that it comes in many forms, ranging from outright technology determinism to a cautious belief that technical development will, when wisely applied, help make government better. Grönlund (2002) reviews some of the definitions from (then, and still) leading countries and finds them similar and typically explicitly mentioning three goals:

1. more efficient government
2. better services to citizens
3. improved democratic processes

These definitions still remain, as they are implemented in official documents and government reform programs. Over the past few years, the point about improved democratic processes has often been played down, both in practice and in definitions. One example illustrating this change in emphasis is the U.S. 2002 E-Government Act, defining e-government as:

"the use by the Government of web-based Internet applications and other information technologies, combined with processes that implement these technologies, to:

a. enhance the access to and delivery of Government information and services to the public, other agencies, and other Government entities or
b. bring about improvements in Government operations that may include effectiveness, efficiency, service quality, or transformation". (U.S. Congress, 2002)

However, this limitation is contested in practice as the following definition shows. The Centers for Disease Control and Prevention (CDC) is one component of the Department of Health and Human Services, the principal agency in the United States government for protecting health and safety. Hence, the CDC Web site is a good example of electronic or digital government in operation.

*Digital government—also called e-government or virtual government—refers to governance affected by Internet use and other information technologies (IT). Digital government is typically defined as the production and delivery of information and services inside government and between government and the public using a range of information and communication technologies.* (Fountain, 2001, 2002)

*The definition used here also includes e-democracy, that is, civic engagement and public deliberation using digital technologies.* (Fountain, 2005)

As we can see here, the term *digital government* is used as a synonym to e-government. While *digital government* is a term frequently used in the US, electronic government is the term preferred internationally, including the United Nations (UN), the EU, the World Bank, and other international actors. Note also that e-government refers to governance, something that many researchers have tried to avoid by defining e-government in more narrow ways, usually for the purpose of being able to measure phenomena more strictly.

Most definitions are designed to address the broader development towards better government. What all recent definitions by major organizations share is that they acknowledge the need for organizational reform to go hand in hand with technology implementation, and focus on the role of government in society. Two sample definitions illustrate this.

*E-government refers to the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.* (World Bank, 2004)

The e-gov efforts by the European Union are based on the definition:

*e-Government is the use of Information and Communication Technologies in public administrations combined with organizational change and new skills in order to improve public services and democratic processes.* (EU, 2004)

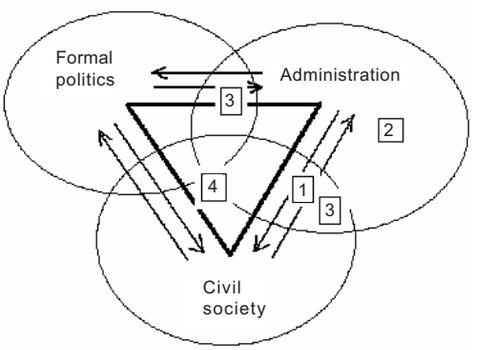
These definitions are about governance rather than government as they define e-gov in terms of its outcomes for socity. The distinction between government and governance has since long been made in political science, but e-gov practice and research tend to use confusing terminology. In short, government refers to what is happening within government organizations, while governance refers to the whole system involved in managing a society. While "government's foremost job is to focus society on achieving the public interest … governance is a way of describing the links between government and its broader environment—political, social and administrative" (Riley, 2004). Another way of describing the relation is that while government is about certain specific activities with a short-term perspective, governance is about processes and outcomes in the long run. Table 4 illustrates this difference by pairing concepts that belong together but emphasize either of these two sides. For example, while "rules" are what governments set up, "goals" are why they do it and "performance" is how they will be evaluated.

As we have seen in the previously discussed definitions, in e-gov practice the term *e-government* is dominating, even when governance is concerned. For example, the World Bank defintion mentions items like *corruption reduction* and *citizen empowerment*, which clearly belong in the right-hand column of Table 4. This conceptual

*Table 4. Government compared to governance (Source: Riley, 2004)*

| **GOVERNMENT** | **GOVERNANCE** |
|---|---|
| superstructure | functionality |
| decisions | processes |
| rules | goals |
| rules | performance |
| implementation | coordination |
| outputs | outcomes |
| **e-government** | **e-governance** |
| electronic service delivery | electronic consultation |
| electronic workflow | electronic controllership |
| electronic voting | electronic engagement |
| electronic productivity | networked societal guidance |

*Figure 1. Different e-gov definitions plotted on the e-gov domain. Arrows indicate influence, circles indicate domains of control, the triangle represents information systems by which the spheres communicate. Intersections indicate transaction zones where control is negotiated by, for example, lobbyists and media on the left-hand side, intermediary service deliverers on the right-hand side, and professional interaction in government boards and committees on the top side. (Adapted from Molin et al., 1975, p. 16)*




confusion is likely one we will have to live with as the term *e-government* is much more frequently used.

The distinction between governance or government makes a big difference in terms of what counts as e-gov information systems, as a look at broad and narrow definitions will show. Figure 1 illustrates the governance domain using a textbook model of society as consisting of three distinct but interrelated spheres: the political, the administrative, and the civil society one. All are mutually dependent by a large number of relations, and integrated by a large number of information systems which are increasingly using ICT. Governance obviously concerns all three spheres, while government can be taken to mean either just the administrative one or the political and administrative in combination. While all the e-gov definitions presented so far discuss e-governance, other more limited definitions exist. For example, OECD (2003) distinguishes among four types of definitions (plotted on Figure 1):

1. "Internet (online) service delivery and other Internet-based activity such as e-consultation" (i.e., mainly the transactions between government administration and citizens in the right-hand side of Figure 1).
2. "E-government is equated to the use of ICTs in government. While the focus is generally on the delivery of services and processing, the broadest definition encompasses all aspects of government activity" (i.e., mainly the right-hand side of the figure but with focus on Administration).
3. "E-government is defined as a capacity to transform public administration through the use of ICTs or indeed is used to describe a new form of government built around ICTs. This aspect is usually linked to Internet use" (i.e., mainly the Administration sphere and the processes linking administration and formal politics).
4. The OECD's own definition, "The use of ICTs, and particularly the Internet, as a tool to achieve better government" (OECD, 2003, p. 23) clearly concerns the whole figure as "better government" must be measured from outside, what good it does for society.

This review shows that while influential definitions of e-gov today include contextual and societal aspects and hence go beyond single government organizations and indeed government as a whole, the OECD taxonomy reveals important differences. Definitions to some extent are mutually exclusive—you cannot measure efficient service delivery, as of definition type 1, and claim this is an exhaustive measure of "a capacity to transform government". Hence, there is no clear way of summarizing all definitions into one. Also, many definitions are normative and hence, while potentially operationally efficient, not useful for scientific descriptive purposes. However, as the Figure 1 illustrates, because major definitions concern the effectiveness of large and complex social systems with ambiguous goals involving many actors, they have to do with communication processes rather than information storage and retrieval. Let me therefore, in conclusion, suggest two definitions that are inclusive in that they

cover the activities involved in the e-gov field, descriptive rather than normative, and theoretically correct in that they observe the difference between underlying concepts of government and governance.

- **Electronic Government:** The use of ICT in communicative processes involved in government activities.
- **Electronic Governance:** The use of ICT in governance processes. The only difference from Electronic Government is that governance processes may not involve government. For example, the activities of partisan NGOs may be included.

While descriptively correct, these definitions may not be operatively guiding in a way that practitioners would like. Also, they do not delimit the field in a way that excludes fields previously defined, for example, "IT in government", as discussed herein. The latter fact means that the definitions are imperialistic in that they subsume earlier definitions.

## E-GOV EVALUATION MODELS

To monitor the development, there are a number of more or less recurrent benchmarking studies covering various areas, the EU, the US, and worldwide (e.g., Accenture, 2004; UNDESA, 2003; West, 2003). Early measurements typically employed some of the ladder models around, usually the 4-step one. For example the EU has used the following model for repeated measurements since 2000:

- **Stage 1, Information:** The information necessary to start the procedure to obtain this public service is available on-line.
- **Stage 2, One-way Interaction:** The publicly accessible website offers the possibility to obtain in a non-electronic way (by downloading forms) the paper form to start the procedure to obtain this service. An electronic form to order a non-electronic form is also considered as stage 2.
- **Stage 3, Two-way Interaction:** The publicly accessible website offers the possibility of an electronic intake with an official electronic form to start the procedure to obtain this service. This implies that there must be a form of authentication of the person (physical or juridical) requesting the services in order to reach stage 3.
- **Stage 4, Full electronic case handling:** The publicly accessible website offers the possibility to completely treat the public service via the website, including decision and delivery. No other formal procedure is necessary for the applicant via "paperwork". (DGIM, 2005, p. 7)

This type of model focuses on technology. There are several similar ones, for example, US researchers often refer to a model by Layne and Lee (2001). Sometimes the last step is named "integration", indicating the current strive towards standardizing data definitions across government agencies so that all processes can be built electronically independently of which, or how many, agencies are involved. The current name for this ideal is "Enterprise Architecture", a term for considering government in a holistic perspective including political and service goals and the means for achieving those: business processes, information systems, data definitions, and review of performance.

More recently, models focusing on organization, in particular integration across government, have emerged. For example the UN uses a 5-stage model to measure e-government evolution:

1. Emerging presence
2. Enhanced presence
3. Interactive presence
4. Transactional presence
5. Networked presence

While the first four stages roughly correspond to the EU model, stage five is characterized by "integration of G2G [government-to-government], G2C [government-to-consumer], and C2G [consumer-to-government] (and reverse) interactions. The government encourages participatory deliberative decision making and is willing and able to involve the society in a two-way open dialogue" (UN, 2004, p. 17). This model is designed as a part of a multicriteria measure of "e-government readiness". The complete set of indices includes a Web Measure Index (the five points the previous example), a Telecommunications Infrastructure Index, and a Human Capital Index (e.g., education level). There is also an E-participation Index including measures of e-information, e-consultation, and e-decision-making (UN, 2004, pp. 16-19).

While the UN index may be seen as inspired by social concerns, there is also increasing evidence of a more business-like approach to government. For example the latest e-government measurement by Accenture (2005) is titled "New Expectations, New Experiences", and focuses on citizen satisfaction. Accenture uses an adoption pyramid including seven consecutive steps: awareness, familiarity, interest, use, satisfaction, and advocacy (Accenture, 2005, p. 25). This new approach is inspired by the finding that online presence is not enough; unless there is demand, there will not be use, and the Accenture

report concludes that "leadership in customer service" (first part of the report title) is what it takes to take e-gov further. They survey a number of countries and find that the level of Internet penetration does not entail a certain level of use. While, for example, Finland and Sweden rank high on both scales, UK and Japan have almost as high Internet penetration but only half the use (p. 25).

We have seen here that while early e-gov status measurements focused on technical aspects of Web presence there is now a shift towards measuring government readiness and citizen or customer satisfaction. This indicates organizational and social aspects are gaining ground complementing the early technology focus.

## FUTURE TRENDS

As for the terms *e-government*, and others discussed here, it is likely they will vaporize gradually over the coming years. ICT tools will become so integrated in government and governance processes that it does not make sense to point them out specifically. The phenomenon of e-gov will hence become even more omnipresent, and following from that various aspects of the redesign of processes will be discussed rather than the "e" itself (or the "m"—"mobile government" is one of today's commonly used technology-induced keywords for discussing technology use in government).

According to the most common e-gov visions-in-practice today, the ultimate goal is to achieve step four in the ladder model of the previous section. Technically, this may indeed be as much as can be done. But the implications of e-gov do not stop with that; there must be a reason for wanting to get there. The obvious reason is making government more effective, but, as critics have already pointed out, an economically efficient government does not necessarily lead to the most efficient governance. For example the register-data-only-once vision has been challenged for being privacy intrusive. The self-service ideal has been challenged for excluding many people who lack economic means to have a computer, or lack the skills to use them. Further still, even if such things are well catered for, more ICT use will have consequences for the way government communicates with society, and within itself.

The Enterprise Architecture vision (which is technically approaching already today in many countries, such as UK, U.S., and Canada) means government must be handled more as a whole. There will be more limitations imposed on each agency in terms of data definitions, interfaces with other agencies, and communication with citizens. This means a more top-down government management mode.

The standardization of government also means that the interface with citizens will change. This change will not entirely be defined by government but by designers of the main software. The interaction styles and standard interactive features will be those that software vendors put into their systems. Government agencies will not find it worthwhile to redesign these; they will only fill them with local content. This means government interaction with citizens will be more similar across agencies and indeed across countries. Maybe this is the true meaning of e-gov—the communication styles which can be implemented in a desktop computer, a PDA, and a mobile phone are those which will become the norm, and government practices will adjust accordingly.

The use of computers in almost every government contact will also mean these will become more formal. Because everything is written, everything has to be legally correct. Because everything has to be legally correct, it will increasingly be centrally produced for reasons of higher quality and better quality control (on top of economic reasons). This means local staff will have less freedom to act with their own judgment. In some countries this is considered an enormous step forward as evils like corruption can be more easily fought. In other countries it is viewed as decreasing service level due to less face to face communication.

The self-service model will lead to users becoming more knowledgable about how government works, as they will increasingly have to find that out for themselves by surfing Web sites, interpreting voice menus, and sms-replies. Where this leads is open to future research, but if knowledge is power, certainly citizens of the near future will have more of it.

There are many issues not yet researched concerning the impacts of e-government. We have shown here that there is an increasing interest in governance processes, but also a trend towards more business-like management and "service orientation" in government. Finally, global dissemination is clearly on the way and there are many hopes for e-gov to help structure government operations worldwide, as the World Bank definitions showed.

## CONCLUSION

This article shows that e-government in many definitions is taken to mean e-governance. A definition covering the major practitioner definition could be "ICT use in governance processes." Although current e-gov practice is technologically oriented, both definitions from international actors and emerging evaluation models emphasize social concern and interest in value for users/citizens, including not only "services" but also participation. There is no doubt that the main driving force behind e-government is making government more efficient, but there is also no doubt that the communication style of e-govern-

ment will have consequences for the relations between governments and citizens, and hence for both individuals, government organization, and government employees. The consequences are still to be seen. There are many interesting developments that cannot yet be measured on a national or international level because they have not yet become so large that they can be seen in national statistics.

## NOTE

The key terms are the author's own definitions. As this article has shown, there are many definitions around.

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## KEY TERMS

**Electronic Government:** The use of ICT (Information and Communication Technologies) in communicative processes involved in government activities. Synonym to digital government.

**Electronic Governance:** The use of ICT in governance processes. The difference from Electronic Government is that governance processes may not involve government.

**IT in Government:** A term used to refer to IT use in internal government processes in the Information Systems literature from, mainly, the 1970s and 1980s.

# Electronic Government at the American Grassroots



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## INTRODUCTION

During the past 10 years or so, governments in the United States have rushed to adopt and implement electronic government or e-government (defined as the electronic delivery of governmental information and services 24 hours per day, seven days per week, see Norris, Fletcher, & Holden, 2001). Today, the federal government, all 50 state governments (and probably all departments within them), and the great majority of general purpose local governments of any size have official presences on the World Wide Web through which they deliver information and services and, increasingly, offer transactions.

In this article, I examine the current state of the practice of e-government at the grassroots in the U.S.—that is, e-government among American local governments. In particular, I address the extent of local adoption of e-government, including the reasons for adoption, the relative sophistication of local e-government, and barriers to and initial impacts of e-government.

## BACKGROUND

It is important to study e-government at the American grassroots for at least four reasons. The first is found in the sheer numbers of local governments. The 2002 Census of Governments reported that there are nearly 88,000 local governments in the U.S., including 19,431 municipal governments, 3,034 county governments, and 16,506 town and township governments, for a total of 38,971 general purpose local governments (U.S. Bureau of the Census, 2002). Second, as I will show in this article that 95% of local governments of 10,000 or greater in population have Web sites for e-government purposes. These two reasons combined mean that the vast majority of Americans have at least the potential to interact with and be affected by local e-government. Third, governments at all levels in the U.S. are spending an enormous amount of money on e-government, annually up from $1.5 billion in 2000 to an expected $6.2 billion in 2005 (Gartner Group, 2000). Fourth, local governments are the closest governments and provide the greatest numbers of services to the people. Thus, these governments have the greatest immediate impact on the peoples' lives. For at least these reasons, then, it is important to understand how and why e-government has been adopted, the functions it performs, how it has evolved, and its impacts.

## DATA AND METHOD

In this analysis, I use data from three nationwide surveys, as well as evidence from focus groups that I conducted in 2002, to help understand e-government at the American grassroots. The surveys were conducted in 2000, 2002, and 2004 by the International City/County Management Association (ICMA) and Public Technology, Inc. (PTI) about local e-government (ICMA/PTI 2000, 2002, 2004). The 2000 survey was mailed to all municipalities with populations greater than 10,000 and all counties with either the council-administrator (manager) or council-elected executive form of government. The response rate was 50.2%.

The 2002 and 2004 surveys were mailed to all municipalities of 2,500 or more in population and all counties with either the council-administrator (manager) or council-elected executive form of government. The response rate to the 2002 survey was 52.6% and to the 2004 survey was 42.4%. In order to provide for direct comparisons between the surveys, I used data from all responding counties but only from municipalities with populations greater than 10,000 from the 2002 and 2004 surveys. With a few exceptions, the respondents to all three surveys were reasonably representative of U.S. local governments as a whole. (For a more detailed discussion of the survey responses, see Holden, Norris, & Fletcher, 2003; Norris, 2005b; Norris & Moon, 2005)

In addition, I employ data from focus groups that I conducted in the fall of 2002 among officials of 37 U.S. local governments that were on the leading edge of e-government adoption and use (Norris, 2003; Norris, 2004a; Norris, 2004b; Norris, 2005a; Norris, 2005b)[1] The focus group is a well recognized method of qualitative data collection, especially in market research but also in research in various disciplines in the social sciences. Focus groups involve researcher facilitated data collection from

*Table 1. Web site adoption*

| | 2000 | | | 2002 | | | 2004 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | | No. | % | | No. | % |
| A. Does your government have a Web site? | Yes | 1573 | 83.6 | Yes | 1866 | 87.7 | Yes | 2491 | 95 |
| | No | 308 | 16.4 | No | 262 | 12.3 | No | 132 | 5 |
| | Total | 1881 | 100 | Total | 2128 | 100 | Total | 2623 | 100 |

group interaction on a pre-determined topic and include three components: data collection, interaction through group discussion, and active participation by the researcher in shaping the discussion (Morgan, 1996) (For more information about the focus group methodology in general, see Merton, 1987; Merton & Kendall, 1946; Morgan, 1993; Morgan, 1996. For a more detailed discussion of the focus group method as applied to this research see Norris, 2004a; Norris, 2005a, 2005c).

The focus groups included chief information officers (CIOs) or their equivalents and top administrative or policy officials from 37 local governments that had adopted e-government, and that at that time were considered on the leading edge of e-government (Appendix A). These persons constituted a body of key informants with critical knowledge of and insights into their governments' adoption of e-government and issues related to it.

## E-GOVERNMENT ADOPTION

Beginning in the mid-1990s, local governments in the U.S. started establishing official sites on the World Wide Web. According to the 2000 survey——that is within about five years of the beginning of the e-government—83.6% of these governments had established Web sites from which they delivered governmental information and services (Table 1). Local government Web site adoption increased to 87.7% in 2002 and to 95.0% in 2004. In 2000, about two-thirds of local government Web sites were three years older or less. If we extrapolate that finding to 2005 (five years later), two-thirds of local government Web sites are eight years old or less today (Table 2). Thus, local e-government is a relatively young phenomenon that has been adopted very rapidly in nearly all local governments in the U.S. with a minimal level of population (10,000 or more).[2]

Previous studies have shown that a statistically significant relationship exists between local government population and adoption of leading edge information technologies (Norris & Demeter, 1999; Norris & Campillo, 2000; Norris & Kraemer, 1996) and between population and the adoption of e-government (Holden, Norris, & Fletcher, 2003; Moon, 2002; Norris & Moon, 2005). These studies employed data from a 1997 survey of computers and local governments and the 2000 and 2002 e-government surveys. Although I did not run tests of statistical significance for the relationship between population and e-government adoption for the 2004 survey data, based on previous work it is highly likely that this relationship exists.

Prior studies have also found that adoption of both leading edge information technologies and e-government may be related to type and form of government (municipal type and professional manager form being positively related), (Holden, Norris, & Fletcher, 2003; Moon 2002; Norris & Campillo, 2000; Norris & Demeter, 1999; Norris & Moon 2005). I did not run tests of statistical significance on the 2004 survey data. Here again, however, there is reason to believe that statistical significance would be obtained if such a test were conducted, there being so few differences between the results of the 2000, 2002, and 2004 surveys.

Although the surveys show how many local governments have adopted e-government and how rapidly, the surveys did not ask why local governments adopted e-government. The hype surrounding e-government predicts that governments will adopt e-government in order to provide services more effectively and efficiently; that they will engage in (usually unspecified) governmental reform and in (equally unspecified) governmental transformation; and that governments adopt e-government as part of a broader plan or strategy for improving the delivery of governmental services (see, for example, Garson, 2004). Based on data from focus groups of officials in governments on the leading edge of e-government, these reasons turn out not to be true.

*Table 2. Age of Web site*

| | 2000 | |
|---|---|---|
| | No. | % |
| Three years or less | 803 | 68.5 |
| 4-5 years | 318 | 27.1 |
| More than 5 years | 52 | 4.4 |
| Total | 1173 | 100 |

*Note: The question about age of Web site was not asked in the 2002 and 2004 surveys.*

*Table 3. Reasons for e-government*

| Responses | Total |
|---|---|
| Information and Services | 25 |
| (Information) | (15) |
| (Services) | (10) |
| Efficiency, economy, and related | 13 |
| Citizen contact, access, oriented, centric | 10 |
| Demand Total | 7 |
| (Elected officials demanded) | (2) |
| (Citizens, businesses demanded) | (2) |
| (Perceived expectations/demand) | (3) |
| IT department led or pushed | 7 |
| Economic development, tourism, advertising the city or county | 6 |
| "Keeping up with the Joneses" | 6 |
| Other | 9 |
| **Total reasons given** | 83 |

The principal reasons that local government officials gave for adopting e-government are much more prosaic (Table 3). The focus groups' 37 responding local governments provided 83 reasons for adopting e-government: 25 were to provide information and services, 10 were for citizen contact or access, and six were for specific functions (usually economic development or tourism). Thus, 41 of the reasons involved providing services or information. Seven responses indicated that actual demand either from elected officials (2), or citizens or businesses (2), or perceived demand (3) were reasons for the adoption of e-government. An additional seven said that e-government had been adopted because the IT department pushed it. Six said "keeping up with the Joneses"—meaning that local government could not be in the position of not adopting e-government if everyone around them was doing so. Nine reasons were coded "other." This left only 13 reasons that were related to efficiency and economy, and none of the reasons given for adopting e-government involved governmental transformation.

## WEB SITE SOPHISTICATION

In the past few years, several studies have examined the Web site content (e.g., Kaylor, Deshazo, & Van Eck, 2001; Stowers, 1999; West, 2003a, 2003b, 2004a, 2004b). For the most part, these studies have concluded that governmental Web sites around the world are at either stage one or two of development that the principal normative models of e-government predict (e.g., Baum & di Maio, 2000; Hiller & Belanger, 2001; Layne & Lee, 2001; Ronaghan, 2002). In other words, governmental Web sites are mainly informational and provide users with only a limited number of opportunities for online transactions. For the purposes of this article, I used the survey data to describe the transactional capabilities of local government Web sites. This description also provides a rough indication of Web site sophistication. That is, the greater the number of basic transactions and the greater the number of more complex (e.g., financial) transactions, the more sophisticated is the Web site.

According to the 2004 survey, the Web sites in majorities of local governments provided a few relatively easy, non-financial transactions. These include council agendas (73.6%), codes and ordinances (71.3%), employment information and applications (60.5%), and downloading forms for manual completion (57.9%). See Table 4. These

*Table 4. Online services adopted*

| | 2000 | | 2002 | | 2004 | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| **Non-Financial Transactions:** | | | | | | |
| Request for service | 284 | 18.1 | 587 | 33.3 | 749 | 28.6 |
| Request for local government records | 234 | 14.9 | 573 | 32.2 | 674 | 25.7 |
| Interactive maps[a] | 175 | 11.1 | | | 722 | 27.5 |
| Registration for programs[b] | 118 | 7.5 | 272 | 15.7 | 427 | 16.3 |
| Permit application or renewal[b] | 77 | 4.9 | 201 | 11.4 | 265 | 10.1 |
| Business license application or renewal[b] | 52 | 3.3 | 101 | 5.8 | 163 | 6.2 |
| Voter registration | 31 | 2 | 40 | 2.4 | 63 | 2.4 |
| Property registration | 15 | 1 | 45 | 3.3 | 72 | 2.7 |
| Delivery of local government records[c] | | | 371 | 21.3 | 458 | 17.5 |
| Download forms for manual completion[c] | | | 1064 | 65.8 | 1519 | 57.9 |
| Communication with individual elected and appointed officials[c] | | | 1271 | 76.1 | 1611 | 61.4 |
| Employment Info/Applications | | | | | 1587 | 60.5 |
| Council agendas | | | | | 1931 | 73.6 |
| E-newsletter | | | | | 688 | 26.2 |
| Streaming Video | | | | | 249 | 9.5 |
| Codes/Ordinances | | | | | 1869 | 71.3 |
| Other | | | | | 65 | 2.5 |
| | No. | % | No. | % | No. | % |
| **Financial Transactions:** | | | | | | |
| Payment of taxes | 41 | 2.6 | 114 | 6.5 | 242 | 9.2 |
| Payment of utility bills | 35 | 2.2 | 105 | 6.1 | 257 | 9.8 |
| Payment of license fees[d] | 27 | 1.7 | | | | |
| Payment of ticket/fines[d] | 26 | 1.7 | | | | |
| Payment of fines and fees[e] | | | 98 | 5.6 | 201 | 7.7 |

*a. This question was not asked in the 2002 survey.*
*b. There were slight wording differences in these questions between the 2000 and 2002 surveys.*
*c. These questions were not asked in the 2000 survey.*
*d. These questions were not asked in the 2002 survey.*
*e. This question is a combination of the previous two questions for the 2002 survey.*

are essentially one-way transactions that are not especially difficult to automate on Web sites. Additionally, 61.4% of these Web sites provide the opportunity to communicate with officials (presumably by e-mail).

Once the "low hanging fruit" has been picked—that is, the easy transactions have been automated—few other functions, services or information have been made transactional on local government Web sites. For non-financial matters, only three functions or services have been made transactional by more than one in four local governments (and none by more than 30%)—requests for service (28.6%), interactive maps (27.5%), and requests for records (25.7%).

In terms of financial transactions—which clearly are fraught with more policy, technical and security difficulties than non-financial transactions—none achieved greater than 10% adoption on local government Web sites. Only one in ten local government Web sites provides for the on-line payment of utility bills (9.8%) and taxes (9.2%), and fewer still (7.7%) permitted the online payment of fines and fees.

## BARRIERS TO E-GOVERNMENT

These data show that the great majority of U.S. local governments with populations of 10,000 or greater have adopted Web sites from which they provide governmental information and services, and that they did so very quickly following the beginning of e-government. However, to date, local government Web sites are not especially sophisticated. The obvious question is why? One way to answer this question is to examine what the survey results say about perceived barriers to e-government (Table 5). Here, majorities of the responding governments said that lack of technology or Web staff (55.7%) and financial resources (57.2%) impeded their ability to implement e-government. Interestingly, responses in 2004 in both areas showed increases over 2002 (+5.9% for technology/Web staff and +10.5% for financial resources). Other notable barriers included lack of technology and Web expertise (36.1%), issues regarding security (34.2%), justifying return on investment (ROI) (31.1%), convenience fee issues (28.2%), and privacy issues (25.7%).

In addition to the barriers reported in the surveys, the focus groups also help us to understand why local government Web sites remain mainly informational. Nearly all of the focus group participants agreed that one reason is to be found in the cost of the transactions to the local governments. If local governments permit "customers" to engage in online transactions using credit cards, these governments have to pay the fees of the credit card companies. This represents a loss of revenue that few local governments feel they can justify and cannot recover this loss elsewhere. Second, few local governments are willing to charge additional fees to cover the cost of online transactions. Officials feel that to charge fees would be inequitable, that their residents (read, voters) would oppose fees, and that fees would also be a disincentive for use of online transactions. Whatever the reasons, few local governments offer online transactions on their Web sites at this writing, and the movement toward offering more online transactions (especially financial transactions) is glacially slow.

*Table 5. Barriers to e-government*

| | 2000 | | 2002 | | 2004 | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Lack of technology/Web staff | 1031 | 54.8 | 1060 | 49.8 | 1462 | 55.7 |
| Lack of financial resources | 840 | 44.7 | 993 | 46.7 | 1501 | 57.2 |
| Issues regarding security | 652 | 34.7 | 791 | 37.2 | 897 | 34.2 |
| Lack of technology/Web expertise | 723 | 38.4 | 673 | 31.6 | 947 | 36.1 |
| Issues regarding privacy | 429 | 22.8 | 622 | 29.2 | 673 | 25.7 |
| Issues relating to convenience fees for online transactions | 409 | 21.7 | 576 | 27.1 | 740 | 28.2 |
| Need to upgrade technology (PCs, networks, etc.) | 525 | 27.9 | 483 | 22.7 | 556 | 21.2 |
| Lack of information about e-government applications | 438 | 23.3 | 303 | 14.2 | 376 | 14.3 |
| Lack of support from elected officials | 192 | 10.2 | 200 | 9.4 | 286 | 10.9 |
| Lack of collaboration among departments | | | | | 382 | 14.6 |
| Justifying returns to investment | | | | | 817 | 31.1 |
| Staff resistance to change | | | | | 439 | 16.7 |
| Resident resistance to change | | | | | 132 | 5.0 |
| Lack of demand | | | | | 605 | 23.1 |
| Credit card issues | | | | | 720 | 27.4 |
| Bandwidth | | | | | 190 | 7.2 |
| Other | | | | | 99 | 3.8 |

## E-GOVERNMENT IMPACTS

Numerous claims have been made in the scholarly and trade literatures that a wide range of (nearly always) positive impacts will occur as the result of e-government (again, see Garson, 2004). Few of these claims are grounded either in the empirical literature about IT and government (which can significantly inform the study of e-government) or in the nascent but growing empirical literature about e-government (see Norris & Zimmerman, 2005; and Norris & Lloyd, 2004). Nevertheless, among other things these claims suggest that e-government will result in

*Table 6. Impacts*

| | 2000 | | 2002 | | 2004 | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Increased demands on staff | 344 | 21.9 | 616 | 28.9 | 687 | 26.2 |
| Changed role of staff | 323 | 20.5 | 570 | 26.8 | 719 | 27.4 |
| Business processes are being re-engineered | 283 | 18 | 453 | 21.3 | 518 | 19.7 |
| Business processes are more efficient | 214 | 13.6 | 367 | 17.2 | 501 | 19.1 |
| Reduced time demands on staff | 135 | 8.6 | 319 | 15 | 547 | 20.9 |
| Reduced administrative costs | 79 | 5 | 147 | 6.9 | 235 | 9.0 |
| Reduced number of staff | 11 | 0.07 | 23 | 1.1 | 57 | 2.2 |
| Increased non-tax-based revenues | 10 | 0.06 | 16 | 0.8 | 27 | 1.0 |
| Citizen contact with officials | | | | | 836 | 31.9 |
| Improved customer service | | | | | 1182 | 45.1 |
| Improved communication with public | | | | | 1392 | 53.1 |
| Other | | | | | 79 | 3.0 |

greater efficiency and economy in governmental operations, staffing reductions, the re-engineering of business processes, increased revenues, greater citizen contact with government, and improved customer service.[3]

Both the surveys and the focus groups examined e-government impacts. I begin with data from the surveys. The data in Table 6 show that in 2004 only 2.2% of local governments said that e-government has reduced the number of staff, 9.0% of governments reported that it has reduced administrative costs, and 20.9% said that it has reduced time demands on staff. One in four said that e-government has increased demands on staff (26.2%) and changed the role of staff (27.4%). Fewer than one in ten local governments (9.0%) reported that e-government has reduced costs, and only 1.0% said that it has increased revenues. However, nearly one in five also reported that business processes are being re-engineered (19.7%) and have become more efficient (19.1%) due to e-government.

The areas in which local governments reported the most positive results from e-government were communication and customer service. Over half (53.1%) said that e-government has improved communication with citizens, while nearly one-third (31.9%) indicated that it increased citizen contact with officials. Finally, nearly half (45.1%) reported that e-government has improved customer service.

The focus group data augment the surveys and also portray a somewhat different picture. The first responses are from closed ended questions that I asked of the focus group participants (Table 7). Here, the top two positive impacts (each achieving unanimity or near unanimity) were increased contact with citizens (39) and re-engineering of business processes (36). Other significant positive impacts included increased efficiency of business processes (31) and that e-government met or exceeded initial expectations (28). Two reported impacts should be considered neutral–changed role of IT staff (38), and changed role of line staff (34). In discussing these two impacts, the focus group participants felt that the primary change in the role of IT staff was that they now were involved in creating and maintaining Web applications vs. creating and supporting legacy applications. Additionally, the participants felt that as the result of e-government, IT organizations have become more end-user centric and operate on more of a "service" orientation. (Interestingly, this continues a trend in IT department orientation begun by the PC revolution). The principal change for line staff is that many of them are now involved in providing and managing content for their departments' Web pages.

*Table 7. E-government impacts: The focus group data (Responses to closed ended questions—n=39)*

| | |
|---|---|
| Increased citizen contact with government | 39 |
| Changed role of IT staff | 38 |
| Business processes are being re-engineered | 36 |
| Changed role of line staff | 34 |
| Business processes are more efficient | 31 |
| Added costs to IT | 30 |
| Met or exceeded initial expectations | 28 |
| Added costs to line departments | 27 |
| Increased work for IT on staff | 24 |
| Increased the number of staff in IT | 12 |
| Produced new revenues | 9 |
| Reduced number of staff in line departments | 1 |
| Increased work for staff in line departments | 0 |

Although not part of this set of questions (and, therefore, not found in this table), nearly all of the focus group participants said that e-government is a *net add-on* to what local governments currently do–not a substitution for it. E-government is just *one more way* to deliver information and services. This can also be seen clearly in the participants' responses to the following closed-ended questions: e-government added costs to the IT function (30); added costs to line departments (27); and increased the work load of IT staff (24). (At the same time, however, the participants did not believe that e-government had increased the workload in line departments). These results (increased costs and work load) must be viewed as negative impacts.

Another potential positive impact according to the hype surrounding e-government is the substitution of technology for staff and, thus, reducing both staff and workload. According to the focus groups, this has not occurred. As shown above, 24 respondents said that e-government has increased the workload in IT departments. Moreover, 12 respondents believed that it has resulted in increases in the size of IT staffs. Further discussion revealed that in several other governments, IT staffing needs had also increased due to e-government. However, for budgetary or political reasons, it had not been possible to add positions to the IT department. Only one respondent noted that e-government had permitted a reduction in the number of staff in other departments.

The portrait that emerges from the focus groups' responses to the closed ended questions indicates that while e-government appears to have produced some positive impacts in its early days, the number of positive impacts is relatively small. At the same time, however, several other expected positive impacts have not occurred and some negative impacts have occurred.

I also led the focus groups through extensive open-ended discussions of e-government impacts during which I asked them to note their greatest disappointments with and their most pleasant surprises from e-government (Table 8). There was a strong consensus (28 participants) that a major and important positive impact or pleasant surprise resulting from e-government was its citizen centricity. The participants believed that e-government served citizens well by making governmental information and services available electronically 24 hours per day, seven days per week. As several said, now citizens can be online and not in line. They also felt that e-government promoted greater openness and responsiveness of government. For these reasons, they felt that e-government was popular with citizens.

*Table 8. E-government impacts: The focus group data (Responses to open ended questions – n=39)*

| **Positive Impacts** | |
|---|---|
| Citizen centric, openness, responsiveness, popularity | 28 |
| BPR, productivity, efficiency, effectiveness | 7 |
| Improve government image | 6 |
| Speed or ease of e-government implementation | 6 |
| Services 24/7 | 4 |
| Other | 21 |
| Total | 73 |
| **Negative Impacts** | |
| Internal governmental issues impeding e-government | 19 |
| Time to market | 8 |
| Vendor problems | 7 |
| Workload and cost | 7 |
| Slow citizen uptake | 6 |
| Legacy system problems | 5 |
| Marketing difficulties | 5 |
| Privacy and security issues | 4 |
| Other | 30 |
| Total | 91 |

Beyond this single area of consensus, however, responses regarding positive impacts and pleasant surprises did not show any particular pattern. Seven participants gave answers that could be interpreted as suggesting that greater efficiency of government, often through business process re-engineering, was a positive result of e-government. Six said that a positive impact of e-government was that it helped to improve the image of government to citizens. Six focused on the ease of implementing e-government applications (vs. legacy applications) as a pleasant surprise. Four pointed to the availability of services 24 hours a day seven days a week as a positive result. All other responses (21) were too scattered to categorize.

Regarding negative impacts and disappointments, nearly half (19) of the participants registered their disappointment that internal governmental barriers (most often turf, departmental autonomy, and lack of inter-departmental cooperation) impeded e-government. While not a direct consequence of e-government, these impediments nevertheless made e-government implementation and diffusion within individual governments more difficult. Other negative impacts or disappointments included: time to market (8), by which these participants meant that they were disappointed with how long it took to roll out e-government applications[4]; vendor problems (7), meaning primarily that the IT vendors were not fully ready to support e-government applications; slow citizen uptake (6)[5]; problems integrating legacy systems with e-government (5); marketing difficulties, meaning difficulty getting word out to internal and external publics about the availability and potential of e-government (5); and privacy and security issues (4). Other responses (30) were too disparate and unrelated to categorize.

In conclusion, evidence from the surveys and the focus groups show, first, that relatively few governments report any impacts at all from e-government. Second, many of the expected positive impacts have not occurred, and third, some negative impacts particularly relating to staffing and budgets, have occurred. The picture that emerges is not nearly as rosy as the hype suggests. However, because e-government is relatively young, impacts can be expected to change over time as e-government continues to evolve, becomes more stable, and maturates.

## FUTURE TRENDS

Local e-government in the U.S. is young, has been adopted very rapidly and continues to evolve, yet remains mainly informational. It is moving in directions predicted by the principal normative models of e-government quite slowly and nowhere is it achieving the potential positive impacts claimed by its most ardent advocates. Nevertheless, the potential exists for e-government to yet become something that at this writing it is not—whether for good or ill. Given the findings in this article, what can reasonably be expected for the immediate future of local e-government in the U.S.

First, it would appear that e-government is not transformational, at least yet. This finding is highly consistent with findings from the literature on IT and government (e.g., Kraemer & King, 2006). Second, it would also appear that e-government, like IT and government before it, is incremental. Third and following from points one and two, the trajectory of local e-government that has been observed to date will likely continue into the foreseeable future. That is, local e-government will be mainly informational with increasing opportunities for interactivity and a small but growing number of transactional capabilities. At least in the near term, the optimistic views espoused by e-government advocates and by scholars whose work is not grounded in empirical studies of e-government and IT and government that e-government will become fully integrated and transformational will not be met. Furthermore, based on the empirical scholarship on IT and government and on e-government, there are few reasons to believe that these expectations will be met in the longer term.

## CONCLUSION

Local electronic government in the U.S., at least as measured by the adoption of official sites on the World Wide Web, is widespread and has achieved mainstream status. In less than a decade from its beginning, more than nine in ten grassroots governments with populations of 10,000 or more have adopted e-government. However, at this writing, local e-government is mainly informational, providing only a few online transactions. Nearly all of the online transactions are relatively basic—downloading minutes, codes and ordinances, and employment forms; requesting services and records; and communicating with officials via e-mail. Fewer than one in ten local governments provide for online financial transactions.

Local governments cite a number of barriers to e-government that may help to explain why e-government remains mostly informational. These barriers principally include lack of technology and Web staff and expertise, lack of financial resources, issues around security, privacy and convenience fees, and justification of ROI. Finally, local governments are slow to implement financial transactions because of the potential loss of revenue from having to pay the charges of credit card companies, and the unwillingness of local officials to impose fees to offset those charges.

In terms of impacts, few governments surveyed reported many impacts at all. And the direction of the reported impacts was not always positive–as the hype has predicted. E-government has not reduced staff, increased revenues, or reduced costs. Only a modest number of governments reported that e-government promoted business process re-engineering and process efficiency or reduced the time demands on staff. Larger fractions reported that it increased demands on and changed the role of staff. To the extent that there is good news in reported impacts it is that most of the surveyed governments said that e-government improved communication with the public and improved customer service. Additionally, the focus group responses both affirmed positive impacts from e-government (e.g., citizen centricity, greater citizen contact, re-engineering, etc.), but also noted more negative impacts (e.g., increased costs to IT and line departments, increased work for IT departments, and increased staffing in IT).

For several reasons and especially because local e-government is costly and has the potential to directly affect the lives of nearly all Americans, scholars should continue to examine local e-government using a variety of qualitative and quantitative research methodologies. Continuing research is needed to keep up with the practice of e-government and to ascertain its impacts of both within and among local governments and on their principal stakeholders—the citizens and taxpayers of America's grassroots governments.

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## KEY TERMS

**Business Process Re-Engineering:** Use of systems analysis and other management techniques to improve and make business processes more efficient; often done in concert with implementation of new IT systems.

**Citizen Centricity:** Making governmental services more available and user friendly to citizens.

**E-Government:** Electronic delivery of governmental information and services 24 hours per day, seven days per week.

**Focus Groups:** Qualitative research method involving researcher-facilitated data collection from group interaction on a pre-determined topic that includes three components: data collection, interaction through group discussion, and active participation by the researcher in shaping the discussion.

**Grassroots:** Governments that are closest to and provide the greatest number of services to citizens.

**Legacy Systems:** Traditional computer software employed to conduct the internal business of running a government (e.g., billing, accounting, budgeting, payroll, inventory management, etc.).

**Local Governments:** Governments that are the closest and provide the greatest number of services to people. Local governments include municipal, county, town, and township.

## ENDNOTES

[1] The focus group research was supported by the National Science Foundation under Grant IIS-0131554.

[2] Web sites do not encompass all of e-government; but they do constitute the vast majority of it today.

[3] Although it is beyond the purview of this paper, many claims are also made that e-government is transformative; that is, it will fundamentally transform government from its current state to one that is more citizen centric, including greater citizen involvement in governmental deliberations and decision making. Empirical studies of whether e-government is or is not transformative have yet to be conducted.

[4] Note, however, that most felt that, on the contrary, e-government applications were much easier to develop and roll out than legacy applications.

[5] Note that this is contrary to the view that e-government increased citizen contact and citizen centricness (but only five respondents so reported and most were from jurisdictions where citizen uptake had not been stellar).

# APPENDIX A

| Name | Gov. Type | Region |
|---|---|---|
| Albuquerque, NM | City | W |
| Bellevue, WA | City | W |
| Boise, ID | City | W |
| Boston. MA | City | NE |
| Broward County, FL | County | S |
| Buffalo, NY | City | NE |
| Charlotte, NC | City | S |
| Colorado Springs, CO | City | W |
| Dauphin County, PA | County | NE |
| Denver, CO | City/ County | W |
| Des Moines, IA | City | MW |
| Fairfax County, VA | County | S |
| Hamilton County, OH | County | MW |
| Indianapolis, IN | City/ County | MW |
| Kansas City, MO | City | MW |
| Lane County, OR | County | W |
| Lincoln, NE | City | MW |
| Manchester, NH | City | NE |
| Middlesex County, NJ | County | NE |

| Name | Gov. Type | Region |
|---|---|---|
| Milwaukee, WI | City | MW |
| Minnehaha County, SD | County | MW |
| Mobile, AL | City | S |
| Montgomery County, MD | County | S |
| Nashville, TN | City/ County | S |
| Philadelphia, PA | City | NE |
| Phoenix, AZ | City | W |
| Plano, TX | City | S |
| Portland, ME | City | NE |
| Provo, UT | City | W |
| Roanoke, VA | City | S |
| San Diego County, CA | County | W |
| San Francisco, CA | City/ County | W |
| Seattle, WA | City | W |
| Sedgwick County, KS | County | MW |
| Stamford, CT | City | NE |
| Tampa, FL | City | S |
| Westchester County, NY | County | NE |
| **Total** | | 37 |

# Electronic Government-to-Government Collaboration



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## INTRODUCTION

Most of the effort of e-government researchers and practitioners today is focused on G2C (government-to-citizen) and G2B (government-to-business) e-government, aiming at the development of information systems that offer to the citizens and businesses the capability to communicate and perform their transactions with the public administration (e.g., various declarations, applications, etc.) electronically, over the Internet or other electronic channels. Taking into account that the quality of most public administration policies and services (delivered through physical or electronic channels) depends to a large extent on the extent and the quality of the collaboration among many involved public organizations (e.g., ministries, regions, prefectures, municipalities, and so forth), it has been widely recognized that much more research is required concerning the exploitation of information and communication technologies (ICTs) for supporting and enhancing government-to-government (G2G) collaboration (Lenk & Traunmüller, 2002; Leitner, 2003; Traunmüller & Wimmer, 2003, 2004; Scholl, 2005). According to Scholl (2005),

*current e-Government research might possibly suffer from the iceberg phenomenon, where most attention is dedicated to the above surface phenomena (i.e,. G2C and G2B e-Government), while "sub-surface" phenomena (such as the G2G e-Government, etc.) not readily available to scientific scrutiny have been spared.*

The collaboration among public organizations, from the same country or even from different countries, has become today much more important and at the same time much more complex than it was in the past, mainly due to the globalization of the economy (resulting in increased interdependence among national economies), the development of various super-national entities (such as the European Union, the North American Free Trade Association (NAFTA), etc.), the continuous growth of the new digital economy, and so on. Also, the growing complexity and the international nature of many problems of modern societies necessitate extensive collaboration among many public organizations of various administrative levels, competences, and mentalities, from one or more countries, for the design and implementation of effective public policies for managing these problems. Additionally, in most cases, the participation of representatives of citizens and enterprises is necessary as well. For example, the design and implementation of environmental policies for a wider area, such as for a wider river basin or lake area, requires extensive collaboration among several public organizations of different administrative levels, competences (e.g., concerning environment, agriculture, forests, industry, tourism, etc.), and mentalities. These public organizations initially have to exchange experiences, knowledge, and views on the environmental problems of the area. Afterwards, they have to design collaboratively effective policies for managing these problems; then follows the collaborative implementation of these policies, which very often includes long and complex interorganizational processes, for example, to grant various licenses for projects or activities having an impact on the environment of this area, and so forth. Also, periodic evaluations of these policies and their implementation are required in order to identify weaknesses, and if necessary, to proceed to corrective actions. The growing importance of the various types of public sector interorganizational networks (e.g., policy networks, service delivery networks, knowledge networks, etc.) have been strongly emphasized in the relevant research literature (e.g., Dawes, 2005; Provan & Milward, 1995; Raab, 2002, etc.), which investigates their basic characteristics, forms, performance, and critical success factors.

However, the G2G collaboration required for the design of effective public policies today is based mainly on physical meetings of various interorganizational physical committees, which are costly in terms of time and money, and very often inefficient, unproductive, and slow. Also, the G2G collaboration required for the implementation of these public policies and the production and delivery of the corresponding services is based on the exchange of information among the involved public organizations using "paper documents", which is costly, slow and inefficient as well. Therefore, it is of critical importance to support electronically the various types of G2G collaboration required for the design of effective public policies (strategic level) and the implementation of them (opera-

*Figure 1. Classification of groupware tools*

| | same place (collocated) | different place (remote) |
|---|---|---|
| same time (synchronous) | Electronic Meeting Systems<br>Team Rooms<br>Group Decision Support Syst.<br>Electronic Whiteboards | Videoconferencing<br>Teleconferencing<br>Document Sharing<br>Electronic Whiteboards |
| different time (asynchronous) | Shared Containers<br>E-Mail<br>Electronic Bulletin Boards<br>Virtual Rooms<br>Document Management Syst. | E-Mail<br>Workflow Management Syst.<br>Formflow Management Systems<br>Messaging Systems<br>Routing & Notification Syst. |

tional level). Moreover, the realization of the highly innovative vision of integrated electronic service delivery (online one-stop government) (Kraaijenbrink, 2002; Wimmer, 2002), through virtual public agencies, these terms denoting single access points to many related electronic transactions and services—usually the ones required in a particular life event of the citizens or enterprises, or by a particular group of citizens or enterprises—which are managed by several different public organizations, will necessitate extensive electronic support of G2G collaboration (mainly at the operational level).

In this direction, this article presents an integrated G2G collaboration platform, which has been designed, developed and evaluated in the project ICTE-PAN (Methodologies and Tool for Building Intelligent Collaboration and Transaction Environments for Public Administration Networks) of the Information Society Technologies (IST) Program of the European Union (IST-2001-35120) (http://www.eurodyn.com/icte-pan). In particular, the next section provides the background concerning the electronic support of G2G collaboration. Then the architecture and the basic components of this G2G collaboration platform are presented. In the final two sections the future trends and the conclusions are outlined.

## BACKGROUND

The development of information systems (IS) which can electronically support the collaboration (e.g., the communication, the interaction, the information or knowledge exchange, the coordination of actions) among the members of a team, who can be either remote or at the same place, both at the strategic and at the operational level, has attracted considerable research interest. This research has resulted in the development of various types of software tools, which can electronically support various types of collaboration, collectively referred to as groupware (Beaudouin-Lafon, 1999; Lococo & Yen, 1998; Ehrlich, 1999; Munkvold 2003a, b; Thomas, 1996), and has given rise to a new research field, referred to as computer-supported collaborative work (CSCW), dealing with the exploitation of ICTs for supporting and enhancing collaboration.

According to Ehrlich (1999), groupware generally supports one or more of the following four basic elements of the teamwork: communication, meetings, information sharing, and coordination of actions. As main groupware tools for supporting communication he mentions videoconferencing, shared whiteboard, group editors, shared documents-applications, media spaces, and e-mail. As groupware tools for supporting meetings, he reports various kinds of software that allow participants to enter ideas and comments on the ideas of the other participants, vote on various issues, and so forth, such as the electronic meeting systems. Information sharing is usually based on enabling any member of the team to store a message or document in a database, which is accessible by all the other members of the team. As main applications for this purpose he mentions electronic bulletin boards and document repositories. Finally as the main groupware applications for supporting the coordination of the actions of the team members, he mentions Workflow Management Systems and Calendar & Scheduling Systems.

In Figure 1 we can see another classification of groupware tools (Lococo & Yen, 1998), which is based on the following two dimensions: (1) whether they support collaboration among participants located at the same place (collocated) or at different places (remote) and (2) whether they support synchronous or asynchronous collaboration.

Groupware tools can be also classified according to the type of collaboration they support into the following two categories:

a. Structured collaboration support tools, such as the workflow management systems
b. Unstructured collaboration support tools, for example, the group decision support systems, the forums, and so forth

Moreover, in this area considerable research is conducted concerning the effectiveness of computer supported collaboration and its critical success factors, especially in the case of virtual teams with remote participants (Furst et al., 1999; Larsen et al., 2002; McDonough et al., 2001; Munkvold, 2003a). The main conclusion of this research is that the effectiveness of computer supported collaboration depends both on technological factors, mainly associated with the capabilities and the appropriateness of the utilized ICT, and also on non-technological factors—mainly on organizational, structural, process, and human factors. The most important of these non-technological factors are the design of the team, the organizational context in which it works, the synergy that will be developed among its members, the processes that will be followed by the team and the material resources available to it. Additionally, of critical importance is the planning and organization of the implementation project.

Of critical importance for the electronic support of the collaborative design of public policies, that is, of the G2G collaboration at the strategic level, can be the group decision support systems (GDSSs). As GDSS is defined, it is a collaboration support environment, which supports group decision making processes, aiming at improving the productivity and effectiveness of decision making, by facilitating the exchange of information and knowledge among the members of the group, speeding up the decision-making process and improving the quality of the resulting decisions (Lewkowicz & Zacklad, 2002; Turban & Aronson, 2001). Most GDSSs include a forum component, which enables a synchronous or asynchronous electronic discussion on a specific topic among several participants: each participant can enter an opinion on this topic, and also read the opinions that have been entered by the other participants on the same topic. Also, some Forums additionally offer to each participant the capability to enter an opinion on another opinion that has been entered by another participant on this topic (multithread electronic discussion). In this way, a high level of interaction and collaboration among the participants can be achieved.

At the operational level, of critical importance for the electronic support of the G2G collaboration required for the efficient and effective implementation of public policies (e.g., for the production and delivery of the corresponding services, the examination of applications for permissions or allowances, the enforcement of laws, and so forth) can be the workflow management systems (WFMSs). According to the Workflow Management Coalition (WfMC) (http://www.wfmc.org), a non-profit, international organization of WFMS vendors, users, analysts and university-research groups aiming at the promotion and development of these systems, a WFMS is defined as a system offering the capability to define, manage and execute workflow processes through the execution of software, whose order of execution is driven by a computer representation of the workflow process logic (WfMC, 1995). A typical workflow process consists of a predefined sequence of steps (called activities); each of them is in general executed by one or more human individuals (called "actors") who can be supported by software applications. The WFMSs in general offer three categories of functionality: (1) build-time functions (they concern the definition and modelling of the specific workflow process we intend to support with the WFMS), (2) run-time control functions (they concern the automation and management of the workflow process for each individual work case and the sequencing of the required workflow process activities, based on the above workflow definition model), and (3) run-time interaction functions (they concern the interaction with human individuals and software applications for each individual work case). The achievement of interoperability between different WFMSs has been the basic target of several technical committees of the WfMC, which have produced several frameworks and specifications for this purpose (e.g., WfMC, 1996, 2001). However, these WFMS interoperability frameworks and specifications have not yet been used sufficiently in practice. For this reason the interoperability between WFMSs of different public organizations, which is often required in order to support the operational collaboration between them, still presents significant complexities, difficulties and costs.

In general, it is common that for the electronic support of G2G collaboration at the operational level some degree of interoperability between the internal ISs of several public organizations is required. There are many definitions of the concept of interoperability. According to Guijaro (2004), interoperability between two ISs is defined as the capability to exchange interpretable data and functionality between them. The European Interoperability Framework (EIF) (European Commission, 2004a, 2004b) adopts a wider definition of interoperability, which includes not only ISs, but also the business processes they support: "Interoperability means not the ability of information and communication technology (ICT) and of the business processes they support to exchange data and to enable the sharing of information and knowledge". Although initially the interoperability efforts were focused mainly on technical issues (aiming at achieving technical interoperability), it was gradually realized that in many cases it was necessary to address as well difficult issues associated with the meaning (semantics) of the exchanged information (for achieving semantic interoperability) and also with the interconnection of the corresponding business processes of the cooperating public organizations (for achieving business processes interoperability).

Many countries in order to facilitate and reduce the costs of achieving interoperability between the ISs of their public organizations (mainly for the integrated delivery of electronic services based on a life-event approach) have developed interoperability frameworks, which include guidelines, specifications and standards concerning the ways of interaction between ISs. As a typical example we can mention the E-Government Interoperability Framework (e-GIF) of the United Kingdom (Cabinet Office—United Kingdom, 2005a, 2005b). It "defines the essential prerequisites for joined-up and Web-enabled government" and includes "technical policies and specifications for achieving interoperability and ICT systems coherence across the public sector", mainly concerning four basic areas: interconnection, data integration, content management metadata, and e-services access. It is supplemented by E-Government Metadata Standard (based on Dublin Core), Integrated Public Sector Vocabulary/Government Category List, E-Government Schema Guidelines for XML, Government Data Standards Catalogue, and Security Policy Framework (http://www.govtalk.gov.uk). Similar interoperability frameworks have been developed in other countries as well, such as Germany (http://www.kbst.bund.de), France (http://www.adae.gouv.fr), Greece (http://www.infosociety.gr), and so forth. Between them there is a large degree of conformity concerning the technical standards they have selected; they are all based on the technologies of the Internet and the World Wide Web.

The achievement of interoperability between the ISs of public organizations of different countries is much more difficult and costly, due to their different organization, administrative culture, legal framework, business processes, and so forth. In this direction the European Union has developed the European Interoperability Framework (EIF) (European Commission, 2004a, 2004b), aiming at facilitating and reducing the cost of achieving interoperability between ISs of public organizations of its member states at the technical, the semantic and the organizational level, both within and across different policy areas, and at supporting the implementation of pan-European e-government services. Also, in the USA the Federal Enterprise Architecture Framework has been developed (Bellman & Rausch, 2004; Office of Management and Budget—USA, 2005), in order to facilitate the horizontal (cross-federal) and the vertical (federal, state, and local) integration of ISs of public agencies (and in general the cross-agency collaboration), and also reduce overlapping concerning ICTs. It consists of five reference models: the performance reference model, the business reference model, the service component reference model, the data and information reference model, and the technical reference model (http://www.whitehouse.gov/omb/egov).

However, most of these public administration interoperability frameworks have not yet been used sufficiently in practice, and need further elaboration and development; therefore the interoperability between ISs of public organizations still presents quite significant complexities, difficulties, and costs.

## AN INTEGRATED G2G COLLABORATION PLATFORM

In the ICTE-PAN project (http://www.eurodyn.com/icte-pan) has been developed an integrated G2G collaboration platform named MERMIG (in Latin characters the Greek word for "ant") (http://www.mermig.com). Its design has been based on one hand on the study of the relevant literature on groupware tools and CSCW, and on the other hand on, the detailed analysis of the requirements posed by four representative real-life pilot projects, which were implemented as part of the ICTE-PAN project, aiming at the electronic support of collaboration in four European public organizations (National Environment Research Institute of Denmark, Ministry of Environment of Lower Saxony, Province of Genoa, University of Aegean) which participated in the project as user-partners:

- the (less detailed) examination of the requirements posed by 150 additional collaborative processes from various public organizations of European Union member states,
- the relevant recommendations, standards and specifications of many European Commission Programs, such as the Interchange of Data between Administrations (IDA) Program, and so forth.

A basic objective of this platform was to support the required G2G collaboration throughout the lifecycle of a public policy, both at the strategic level (collaborative design of public policy) and at the implementation level (collaborative implementation of public policy). In this direction for the design of the platform was taken into account the theoretical framework for public policies proposed by OECD (2003), which considers the whole policy making process as a cycle of policy preparation, implementation, and evaluation activities, consisting of five stages: agenda setting, analysis, policy creation, implementation, and monitoring. Also, we adopted a knowledge-based public policy and decision-making view based on the theoretical framework proposed by Holsapple and Whinston (1996). According to this view, public policies, and decisions are considered as pieces of descriptive or procedural knowledge referring to an action commitment for managing a social problem; therefore the public policy

*Figure 2. Discussion tree in the consultation module*

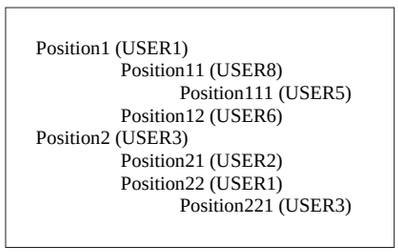
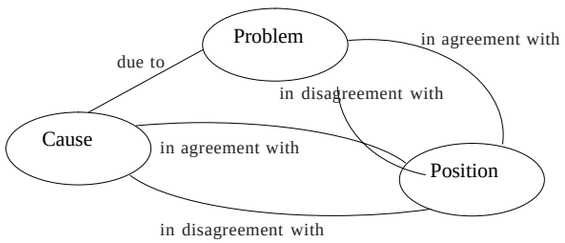



*Figure 3. Consultation ontology*




and decision making process can be viewed as a collaborative production of new knowledge, providing a refined understanding of the problem or evidence justifying or challenging alternative actions that might be followed.

Based on these requirements and on the above theoretical frameworks, the modules of this G2G collaboration platform and their functionality were designed, taking into account the features of the existing groupware tools, and also designing innovative features where necessary. The main modules/services of the platform are:

1. Consultation
2. Structured consultation (based on a predefined ontology)
3. Extended workflows management
4. Extended workflows modeling
5. Document management
6. Content management
7. Advanced search
8. Calendar

In particular, the G2G collaboration platform offers initially the capability to create a virtual team, define its members, create its virtual workspace with all the above modules/services (or some of them), and then define for each member his/her access rights to these modules/services. Very important for the support of G2G collaboration at the strategic level, especially for the agenda setting, analysis, policy creation, and monitoring stages, is the consultation module. It offers the capability to organize an electronic consultation on a topic: in the window of the consultation each member of the virtual team can enter "positions" (e.g., views, opinions, etc.) on the topic of the consultation, read the positions entered by the other members on this topic, then on each of these positions enter new positions, and so on (multithread electronic discussion). In this way a discussion tree is created, similar to the one shown in Figure 2, consisting of interconnected positions of the participants, which constitutes a synthesis and visualization of their experiences and knowledge on this topic.

However, from the requirements analysis it was concluded that very often a higher level of organization, structure and focus is necessary in public policy consultations in the public administration, especially if the topic is highly specialized and complex, and the participants are heterogeneous (e.g., of different background, mentality, etc.). For this purpose an innovative structured consultation module was developed offering to each member the capability to enter semantically annotated positions, based on a predefined consultation ontology. According to Gruber (1993) an ontology is defined as a "formal explicit specification of a shared conceptualization". Usually an ontology constitutes an abstract conceptual model of a particular domain, which identifies the kinds of entities existing in this domain and the kinds of relations among them. As consultation ontology is defined the set of the allowed kinds of positions that the participants can enter in a consultation, and of the allowed relations among them. For example, in a structured consultation on the environmental situation of an area, the participants may be allowed to enter only the following three kinds of positions: problems (i.e., environmental problems of the area), causes of each of these problems, and positions in agreement or disagreement with these problems or causes. In this structured consultation the consultation ontology is shown in Figure 3.

The discussion tree that will be gradually created from this structured consultation will be similar to the one shown in Figure 4. In this way we can achieve a higher

*Figure 4. Discussion tree in the structured consultation module*

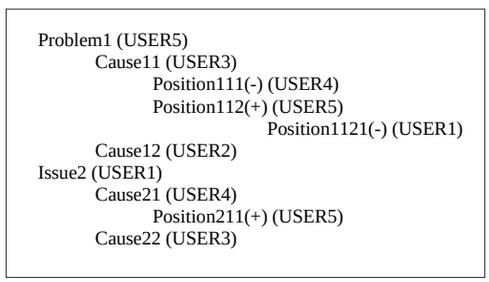


*Figure 5. Ontology of public policy design and implementation*


**Legend**
gsqr = generalise, specialise, question-replace
soc = supports, objects-to, comments-on

level of discipline and homogeneity in the contributions of the participants, who are often of different background, experience and mentality, usually belonging to several different public organizations from the same country or even from different countries, and therefore a higher level of organization, structure, focus and effectiveness of the consultation. Moreover, this semantic annotation of the contributions of the participants enables a better processing, exploitation and management of them, and in general sets the foundation for a more efficient knowledge management.

In order to support and guide the definition of the specific ontology of a structured consultation, an ontology of public policy design and implementation has been developed and incorporated in this Structured Consultation module (Loukis, 2004). This ontology consists of the main concepts (that is, kinds of discussion elements) used in public policy design and implementation, and the relations among them. It is shown in Figure 5. It is an "horizontal" ontology, since it can be used in all thematic areas of government activity. For the development of this ontology we have taken into account the ontologies of existing argumentation systems, such as the gIBIS (Conclin, 2003; Conclin & Begeman, 1988, 1989) and the HERMES (Karacapilidis, 2000), and we have complemented them with additional concepts and relations in order to cover the whole public policy lifecycle.

For defining the specific ontology of a new structured consultation we can use an appropriate small subset of the concepts and relations of this ontology of public policy design and implementation, possibly in combination with additional concepts and relations not belonging to this ontology. In general, a structured consultation in order to be efficient and effective should focus on not more than 3-4 concepts and 5-6 relations among them, since more concepts and relations in the same structured consultation might cause confusion and result in inefficiency and ineffectiveness.

The MERMIG platform also supports the required G2G collaboration at the operational level for the implementation of public policies (e.g., for the production and delivery of the corresponding services, the examination of applications for permissions or allowances, the enforcement of laws, etc.), which is usually based on lengthy and complex processes, with the extended workflows modeling and the extended workflows management modules. These two modules offer the capability initially to define/model (in XPDL (XML Process Definition Language) (Workflow Management Coalition, 2005) and then to automate and manage an extended workflow, which includes both single person activities (i.e., activities executed by only one person) and collaborative activities (i.e., activities of unstructured or structured consultation type, in which several persons participate). In this way the concept of the classical workflow, which consists only of single person activities, is extended in order to cover administrative processes including various collective decision-making and consultation phases (e.g., performed by various types of committees), which are quite usual in public administration for planning, budgeting, granting licenses/permits, and so forth. For example, the process of examining applications for granting licenses/permits for significant activities of citizens or enterprises usually includes initially a number of single person activities (e.g., examination of the application by a number of public servants from administrative, financial, technical, and other viewpoints), then it includes some consultations (e.g., among the Directors of the main public organizations involved, etc.), then some more single person activities (e.g., detailed examination of some critical aspects of the application, composition of administrative decision documents, etc.), and finally one or more consultations (e.g., for final decision making). Also, activities planning and budgeting in public administration very often includes a sequence of consultations with many participants, usually in combination with some single person activities between them.

The extended workflows modeling and management modules enable the electronic support of a very broad range of big and complex G2G collaboration tasks of various degrees of structure, which can well be modeled as extended workflows consisting of single person activities and collaborative activities. Each of these activities can invoke another module of the platform, such as the consultation module, the structured consultation module, or other modules (e.g., the document manager, the content manager, the calendar, etc.), or even other external applications.

It should be emphasized that these two modules of MERMIG offer the capability of hosting and implementing big and complex G2G inter-organizational processes (with some activities performed by public organization A, some other activities by public organization B, etc.), totally on this platform (by giving appropriate access to it to all the involved public organizations, so that each of them can access only the activities). This centralized approach offers the big advantage of avoiding the complexities, difficulties and costs we would face by following a more decentralized approach for achieving interoperability among the heterogeneous IS of all the involved public organizations. These complexities, difficulties and costs are, as mentioned in the previous section, still quite significant, despite the various interoperability frameworks that have been developed. However, if such a centralized approach is not feasible (e.g., for legal, political or administrative reasons), and a more decentralized approach is necessary, then it is possible to interconnect the platform to existing IS of the cooperating public organizations easily and with minimal effort and cost, due to the inherent interoperability capabilities of the platform (since its design has been based on the service-oriented architecture (SOA) paradigm, and for its implementation has been used the J2EE Connector Architecure (JCA)).

## FUTURE TRENDS

Already two applications/evaluations of this G2G collaboration platform have been performed. The first of them was in the four real-life pilot projects, which were implemented as part of the ICTE-PAN project, as mentioned in the beginning of the previous section, aiming at supporting collaboration in the four European public organizations (National Environment Research Institute of Denmark, Ministry of Environment of Lower Saxony, Province of Genoa, University of Aegean), which were the user partners in this project. The corresponding evaluation was based on the ISO/IEC 14589 and ISO/IEC 9126 standards (Loukis et al., 2005). The second one concerned an electronic consultation on a public policy issue, and the corresponding evaluation was based on the Technology Acceptance Model (TAM) (Karacapilidis et al., 2005). In both these applications the results of the evaluations were positive.

Moreover, this platform is already used in several other projects, which will give more opportunities of additional evaluations in real-life G2G collaboration types. The most important of these projects are (http://www.mermig.com):

- The IST project SecurE-Justice (http://www.secure-justice.org), which aims at creating a secure environment for electronically supporting the collaboration among the numerous police and judicial au-

thorities involved in a penal trial, in the whole lifecycle of a criminal case (including the phases of investigation, collection of evidence, debate, and judgment)
- The IST project Intelcities (http://www.intelcities.com, intelcities.iti.gr/intelcities), which aims at providing electronic support of the required collaboration among all the public authorities involved in the management of a big city, such as city authorities, regional agencies, national government agencies, utility providers, transport services providers, and so on (and also nongovernment organizations, citizens, enterprises, etc.)
- The project of developing an integrated environment for supporting the required collaboration among the Departments of the General Prosecutor's Office in Georgia

Concerning the area of electronic G2G collaboration, considerable research is in progress, mainly focused on supporting the G2G collaboration at the operational level, which is expected to increase in the future. It is dealing with understanding the numerous technical and nontechnical issues faced for achieving G2G operational interoperability at the IS and at the business process level, elaborating solutions for them and developing interoperability frameworks, and also evaluating their applicability in real-life situations. However, we believe that more research is required in the future on the much more difficult and demanding problem of providing electronic support of G2G collaboration at the strategic level for the design of public policies.

## CONCLUSION

In this article initially the fundamentals of electronic collaboration are outlined. Then the G2G collaboration platform MERMIG is presented, which has been developed in the ICTE-PAN project, and can electronically support a wide range of G2G collaboration forms, virtual committees and inter-organizational networks in the public administration. This platform possesses significant innovative features and capabilities:

1. It can support G2G collaboration both at the strategic level (for the design of public policies) and at the operational level (for the implementation of public policies).
2. It includes a module for supporting structured consultations, based on predefined ontologies.
3. It includes modules for modeling, automation, and management of extended workflows.
4. It incorporates an ontology of public policy design and implementation.

A more detailed description of this G2G collaboration platform has been published in other papers (Loukis & Kokolakis, 2003; Loukis & Kokolakis, 2004).

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## KEY TERMS

**Computer-Supported Collaborative Work (CSCW):** A research field dealing with the exploitation of ICTs for supporting and enhancing collaboration among the members of a team (remote or collocated) who are working for the achievement of a shared objective.

**Extended Workflow:** A workflow consisting of both single person activities (i.e., activities executed by only one person) and collaborative activities (i.e., activities of unstructured or structured consultation type, in which several persons participate).

**G2C (Government-to-Citizen) E-Government:** Use of ICTs for offering to the citizens the capability to communicate and perform their transactions with the public administration (e.g., various declarations, applications, etc.) electronically, over the Internet or other electronic channels.

**G2B (Government-to-Business) E-Government:** Use of ICTs for offering to the businesses the capability to communicate and perform their transactions with the public administration (e.g., various declarations, applications, etc.) electronically, over the Internet or other electronic channels.

**G2G (Government-to-Government) E-Government:** Use of ICTs for supporting the collaboration (e.g., the communication, the interaction, the information/knowledge exchange, the coordination of actions) among public organizations for achieving a shared objective, both at the strategic level (e.g., for the collaborative design of effective public policies) and at the operational level (e.g., for the collaborative implementation of public policies and provision of corresponding services to citizens and businesses).

**Group Decision Support System (GDSS):** A collaboration support environment, which supports group decision making processes, aiming at improving the productivity and effectiveness of decision-making, by facilitating the exchange of information and knowledge among the members of the group, speeding up the decision-making process and improving the quality of the resulting decisions.

**Groupware:** Software tools, which can electronically support various types of collaboration (e.g., communication, information/knowledge exchange, interaction, coordination of actions) among the members of a team (remote or collocated) who are working for the achievement of a shared objective.

**Interoperability:** the capability to exchange interpretable data and functionality between ISs and the business processes they support.

**Interoperability Framework:** A set of guidelines, specifications and standards concerning the interaction between ISs of different organizations, which aims at facilitating the interoperability between them.

**Ontology:** A formal explicit specification of a shared conceptualization; usually it constitutes an abstract conceptual model of a particular domain, which identifies the kinds of entities existing in this domain and the kinds of relations among them.

**Structured Consultation:** A consultation in which each participant is allowed to enter only some pre-defined kinds of semantically annotated positions, with only some pre-defined allowed relations among them (defined by the consultation ontology).

**Workflow Management System (WFMS):** A system which offers the capability to define, manage and execute workflow processes through the execution of software, whose order of execution is driven by a computer representation of the workflow process logic.

# Electronic Service Delivery in the Local Indian Community of Visakhapatnam

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## INTRODUCTION

New public management (NPM) conceptualised public administration as a business, to be managed with business-like techniques. Since services had to be assessed by the criteria of quality, efficiency, and satisfaction of citizens, the public sector had to reorganize its processes. As strong emphasis was on the services, improving their delivery was expected to facilitate achieving the above criteria. The terms of the NPM approach such as "customer focus, managing for results, and performance management" have become part of the standard language of public administration (Ali, 2001; Bekkers & Zouridis, 1999; Crossing Boundaries, 2005; Spicer, 2004).

## BACKGROUND: ICTS IN IMPROVING PUBLIC SERVICE DELIVERY

Information and communication technologies (ICTs) are considered to raise the speed and quality of the public service delivery. Expected increase in public access to government services and information leading to more openness, facility for remote communication and transactions, scope for citizens' virtual participation in democratic processes, reduced costs of public services, rebuilding relationships between governments and citizens, and enhancing the efficiency and effectiveness of delivery so that services can be accessed by citizens at any place/time were the reasons to embrace the ICTs (Ali, 2001; Bekkers & Zouridis, 1999; Phythian & Taylor, 2001). Many developed countries have decided to utilize ICTs for delivery of public services. The Canadian government wanted to achieve the status of the government most connected to its citizens, enabling them access to all government information and services online at the time and place of their choosing by 2004 (Government of Canada, 1999). The Prime Minister of the United Kingdom set a target of making all central government public services available over the Internet and the Web by 2005 (National Audit Office, 2002). Australia had set a more ambitious target for electronic service delivery (ESD) of 100% of all appropriate services electronically on the Internet by 2001. The United States and Germany were rated highly for interactivity and transparency of government Web sites. Similar to the above, various governments have set targets of interest in improving public service delivery through electronic channels has been rising.

## ESD—AN OVERVIEW

With regard to transactions over the Internet, viz. the ESD, there are different definitions. The e-Europe 4-stage framework defines the transactions as follows (Scottish Executive, 2004).

- Online information about public services
- One-way interaction, for example, downloading of forms, discussion forum, e-mail
- Two-way interaction, for example, forms returned electronically, e-mail response
- Full online transaction, for example, full electronic interaction including order, delivery, payment, and posting of transactions

West (2004) states that features are defined as services only if the entire transaction can occur online … if a citizen has to print out a form and then mail it back to the agency to obtain the service, we do not count that as a service that can be fully executed online. Searchable databases count as services only if they involved accessing information that results in a specific government service response" (p. 5). He assessed that North America (including the United States, Canada, and Mexico) offered the highest percentage of online services with 53% of sites having fully executable online services. The Pacific Ocean islands (43%), Asia (30%), Western Europe (29%), and the Middle East (19%) were the other regions, in that order. Of the 198 nations analyzed by his study, Singapore had the largest number of services, with an average of 9.5 services across its various government agencies. Bahrain (5.0 services), China (3.2), the Bahamas (3.0), the United States (2.9), Hong Kong (2.5), Australia (2.3), and New Zealand (2.1) were notable countries.

Ronaghan (2002) feels that "all government services can be classified under one of three fundamental categories: informational, interactive, and transactional" (p. 8). As services are the public face of governments, providing the citizens an efficient and alternative medium to interact with the service providers became the primary objective of e-government initiatives. For this article, Ronaghan's classification is used.

## CRITIQUE OF ESD

It has been cautioned that the Internet is just another medium for service delivery. Lack of connectivity to the Web, inferior technology, limited e-mail capacity, and absence of intranets have to be addressed before realistically expecting online service delivery to be effective. Ronaghan (2004) considers that, "online service delivery should be thought of as complementary rather than accepting the more popular view that it will ultimately replace many traditional channels for public service delivery" (p. 4). Bekkers and Zouridis (1999) have reservations on the use of ICTs for service delivery due to democratic implications. They question "the consumer model of democracy and its contribution towards improved democratic relationships between citizens and public administration" (p. 190). There has been a concern among "academics, activists and elected officials that government Web sites might focus more on providing services, and less on facilitating civic involvement. This type of service orientation, they argue, treats citizens as consumers rather than partners in government, and thus inhibits public engagement with the nation's political environment" (Ronaghan, 2002, p. 9).

There are criticisms that in order to catch up with the private sector, the public sector has largely mimicked what the former has done in e-commerce and adopted it as a model for delivering electronic services (Kaylor, Deshazo, & Van Eck, 2001). The other criticism is that e-government focuses upon relatively simple transactions. According to Anttiroiko, "the traditional representative system gives citizens two basic roles, those of voters and service users." He hopes that the experience gained in Finland will certainly help when designing new forms of citizen-centred e-governance not only in Finland but also in other advanced information societies (Anttiroiko, 2004). Lenk (2002) points out that "the activities of public sector organisations are much more diverse than a focus on 'services' suggests" (p. 88). We hope that the widespread concern expressed by scholars on the hitherto "service users" dimension of the citizens in e-governance projects and confining the e-services to less complex services would result in due attention for the role of the citizen as "voter." Similarly the complex nature of services needed by the citizens might be addressed while implementing e-governance across the globe.

## E-GOVERNANCE IN INDIA

India, a leading advocate of e-governance in the developing world was assessed to possess an e-government index of mere 1.29, indicating a minimal e-government capacity (Ronaghan, 2002). E-governance efforts in India so far have been targeted towards higher-level government organisations. A few local governments have adopted e-governance. Norris and Moon (2005) noted that "relatively few governments in the United States at any level and of any size have developed truly sophisticated e-government offerings. Most e-government in the United States today is principally informational—that is, it involves the one-way transmission of information from government to citizens, usually by way of static information pages ("brochureware"), downloadable forms, and e-mail (p. 64). Earlier, Edmiston (2003) acknowledged that in the United States "most state and local government Web sites today remain in this (publishing) stage. Currently, information tends to be quite substantial, but the ability to interact with government online, which is the next step, is much more limited, especially at the local level" (p. 26).

## LOCAL E-GOVERNANCE

Regarding e-government in The Netherlands, Leenes and Svensson (2002) stated that "large national organisations implement Electronic Service Delivery (ESD) fairly successfully, while municipalities are slow to adopt ESD. This is a pity, since municipalities account for over 70% of the public services. Carbo & Williams (2004) said that around 80 % of citizens' transactions are occurring at the local government level. With regard to the United States, Norris, and Moon (2005) stated that "grassroots governments are closest to citizens and deliver the greatest number of services directly to the people" (p. 65). However, they claimed that even in United States, "local government Web sites, measured by the number of online transactions available, are not particularly sophisticated" (p. 75). In India too, only a few local governments have adopted e-governance and are delivering services electronically. The primary cities of New Delhi, Mumbai, Kolkota and Chennai are nowhere near these few cities. They have Web sites, which fall under "brochureware" and contain a substantial number of "dormant" or "desert sections."

Some of these Web sites can also be termed "static Web sites." Thus, they fall under the category of "First generation e-government."

Hence, the efforts made independently by a secondary city, Visakhapatnam, assume significance. Its achievements in ESD and e-democracy attracted the attention of Steven Clift, a well-known e-democracy proponent (Clift, 2003). A profile of this city's ESD would enable other local governments to make informed decisions about the services that a municipality can deliver using electronic channels.

## VISAKHAPATNAM MUNICIPAL CORPORATION (VMC)

Visakhapatnam is the second largest city in the State of Andhra Pradesh. The municipal authority started in 1858, is covering an area of 111.60 sq.kms serving 1.2 million people. This city government, VMC, is considered as a pioneer in implementing e-governance among the local governments in India (Venkatakrishnan, 2003).

Visakhapatnam's e-governance efforts revolve around its dynamic Web site. This transactional Web site claims that information technology can play a major role in improving the delivery of services, and Information Technology is all about connectivity. Connectivity brings proximity, which makes the delivery of services better. In the context of the Visakhapatnam Municipal Corporation, there is a tremendous possibility for utilising the Information Technology tools for providing better services to the citizens of the city. The Municipal Corporation of Visakhapatnam envisages delivering a host of civic services by using the Information Technology platform" (http://www.visakhapatnammunicipalcorporation.org/Saukaryam/Saukaryamentails1.asp).

## SCOPE FOR CITIZENS' PARTICIPATION

The Web site mentions that CITIZENS are the partners in the vision of delivering services electronically. This displays the VMC's attitude in treating the citizens as decision makers rather than mere recipients of services. The Web site has provisions for a citizens' forum, providing feedback to the city administration, chat facility, contacting the municipal commissioner, and conducting polls on various civic issues. A recent posting on the citizens' forum goes to the extent of questioning that the complaints and suggestions section of the Web site is down these days purposefully. There was also a criticism by one of the complainants in this citizens' forum that the issue brought to the notice of the city administration by him long back still remains unattended. Displaying such postings prominently in the Web site demonstrates the healthy democratic practices followed by VMC. A section of the Web site invites suggestions from the citizens on various issues such as sanitation, street lighting, taxation, roads, administration, water supply, births/deaths, beautification, city planning, and others. In addition to the prize-winning suggestions, a few other appreciable entries are exhibited in this Web site. A citizen charter outlining various responsibilities and functions of VMC and aiming at "streamlining public service and informing the citizens of their rights and responsibilities" (http://www.visakhapatnammunicipalcorporation.org/citizenscharter/citizenscharter1.asp) too exhibits the citizen centric nature of the government. These provisions to a large extent counter the criticisms that there is limited scope for the citizens to perform their role as voters in governance systems adopting ESD.

## INFORMATIONAL SERVICES

In India a large number of governments (national, provincial, and local) are operating. Therefore, availability of correct information itself ensures the transparency and leads to good governance. In its Web site, VMC provides details such as a procedure for obtaining a building permit, the time limit for grant or refusal of a building application, requirements for sites and factory/industrial, educational, institutional and public office, commercial/mercantile and residential buildings, security deposits, lighting and ventilation requirements, mandatory inspections, and issue of a fit-for occupation certificate by local authorities. These rules are very much relevant for any existing or proposed construction and have been arranged in a sequential order on the Web site. It makes it easier to navigate.

Sanction of building permission is an area where citizens faced innumerable problems from the street-level bureaucracy of the local governments across the country. In VMC, once an application is submitted for building permission, a number is allotted to the application. Using this number, any applicant can log into the Web site and check the status of the application. This might reduce the number of trips one has to make to the local government office to get the permission for building construction. A summary of pending building plan proposals can be obtained through this Web site. Anyone can use this information, especially the elected representatives to make the officials of the VMC more accountable by raising the issue in the council meetings. Similarly, around 120,000 property and water tax assessments in the city have been computerized. Anyone can visit the Web site

and get details of calculations made by the VMC to arrive at tax dues by entering the relevant unique assessment number. This also ensures transparency.

The procedure for valuation of property tax has been prominently provided in the Web site. Prevailing rates of taxation, calculation methodology and examples have been linked to this page making the information much easier to obtain. This reduces the scope of manipulation by the lower level bureaucracy who might harass the citizens for pecuniary benefits. Reports on ward wise collection of various revenues can be generated from the Web site. They can be compared with the ward wise works and allocation of resources. The demand collection and balance (DCB) statement for house tax can be generated from this Web site for all city wards. (http://www.visakhapatnammunicipalcorporation.org/PropertyTax/dcb.asp). This statement, showing details of outstanding dues in each ward, would enable the city administration to concentrate on lagging wards.

The search for building plans approved by the VMC year-wise or by using the building application number or applicant's name or location of the building would display the specifications, approved plan details and other information such as applicants and architects. Approved layouts for housing are also mentioned in the Web sites. This information on building plans and layouts are a boon to prospective purchasers of land, apartments, and buildings.

Information regarding officers responsible for various functions and their contact details provided in the Web site enable the citizens to contact the concerned officer directly to get any service provided by the VMC. Information about water supply, an important service provided by the local governments in this part of the world, is available in the Web site. This includes important aspects such as status of water supply, distribution timings in various locations in the city, and names of persons concerned with water supply. A click on any ward in the map displays the water supply, public health and sanitary services arrangements, and location of various public facilities in the ward.

Further, tender notices issued by the VMC are available on the Web site, department wise (civil, electrical, health, etc.) and class wise. Efforts have been made to electronically procure the services needed by the VMC in a transparent manner by displaying details such as estimated cost, sanction date, contractor name, and stage of work for various works. The search facilities in the Web site would enable anyone to find out the works in various wards by different departments such as civil, electrical, mechanical, underground drainage system, and water supply. The number of the work, its name, estimated cost, sanction date, work order date, project completion date, name of the contractor and stage of work, can be learned. The Web site clearly acknowledges the citizens' right to information by stating that "Every citizen has a right to know about the functioning of the government machinery as it is directly related to him ... The Web site will give online information related to how your property tax is arrived at, related procedures and Government rules, Building rules, regulations etc. and anything you do not have an access to, but need nevertheless" (http://www.visakhapatnammunicipalcorporation.org/Saukaryam/yourrighttoinfor9.asp). The spirit of openness and transparency demonstrated by these statements have been matched by the display of information in the Web site.

## INTERACTIVE SERVICES

Various sections of the Web site provide facility to contact the Commissioner (CEO of the Corporation) and Mayor on any subject related to the corporation. A page about the citizen forum helps any citizen in posting a message about any aspect of the city. Polls on various issues of urban governance have been conducted so far through this Web site. There is an upward trend in the number of voters participating in these electronic polls. Chat facilities are made available for enabling interaction among citizens.

## TRANSACTIONAL SERVICES

Transactions that can be completed through the Web site or through the nodes available in the civic service centres or at the banks connected with the server of VMC can be termed as transactional services. In the case of VMC, online facilities for payment of property tax, water tax, registration of birth and death by individuals and hospitals, learning the status of the building plan/application, registration of complaints/suggestions, and learning their status can be considered as the major transactional services. In online counters of various banks, anybody can pay the dues to the VMC by presenting the relevant assessment number. Once payment is made in the bank connected to the main server at VMC, necessary updating is carried out automatically at the main server.

The possibility to make payments at the banks and citizen service centres operated by the VMC enables citizens not having access to the Internet and it addresses the problems of "digital divide." Moreover, online payments can be made using the credit cards of various banks. Such facility is extended to the registered users only with a view to serve the genuine users. Similar registration is necessary for birth and death registrations and for the home delivery of these certificates. Details of online complaints would be forwarded to the concerned

officer for immediate attention. They would also reach the database for monitoring the grievances settlement.

## OTHER FEATURES

The VMC Web site has been effectively used for campaigning on civic issues such as rain water harvesting, public participation in city sanitation, greening the city, adoption of various projects and the save water campaign. Provision of information by topic has made it simpler and the Web site is easily navigable. Every single page also has links to relevant subtopics. For instance, the page on birth registration will be having links to related aspects like a note on birth and death registrations, rules relevant to the registration, and download of various forms. The volume of services such as online payment through the banks is increasing continuously since the introduction of the facility in December 2000. The number of banks involved and transactions and the amount remitted in these counters show a steady increase. Even on Sundays, payments due to the VMC have been made through bank counters, which operate on holidays as well. Further, the number of visitors to this Web site shows an upward trend.

VMC's e-governance effort by collaborating with various private operators either for accepting online payment, or for designing, hosting, and maintaining the Web site, or laying the optic fibre in all parts of city, is a good example of public-private partnership in local public service delivery. Thus, it is a unique experiment in local e-governance in India. The ability to generate reports on various electronic transactions is an additional benefit of this Web site. This would help in not only gauging the performance of the corporation, but also in reducing the workload of the various categories of its employees. The corporation can effectively redeploy them for carrying out other pressing requirements.

## FUTURE TRENDS

As outlined earlier, the service delivery aspect of public administration is becoming more relevant in all parts of the world. Due to the decentralization movement across the globe, the local government functions are likely to increase many folds. These grassroots governments, already saddled with the responsibility of delivering a substantial number of public services, are facing declining revenues. When more functions are transferred from higher-level governments with less revenue sources, they have to adopt innovative methods to deliver the public services. The initiatives taken by a few local governments to adopt ESD might be an answer in this regard. Hopefully, most of the local governments in the world would resort to ICTs in the future. This might lead to questions raised earlier such as addressing the role of the citizen as a voter as well, protecting the information privacy of the citizens, and digital divide. Satisfactory answers to these questions are essential while adopting the ESD in a large scale. Further, there is a need to integrate various levels of government leading to "joined up government" so that the citizens can access the services from just one Web site rather than visiting many Web sites.

## CONCLUSION

Though VMC is a pioneer in ESD in India, there is enormous potential to improve by increasing the range of transactional services from a few to a maximum possible. There is a necessity to mention the privacy policy of VMC in the Web site and reorient it to protecting the privacy of individuals. Though there are a substantial number of visitors to this Web site, the number of participants in the civic polls is miniscule. Continuous research and interaction with its citizens and exchange of experiences with a few leading cities in the world with regard to ESD would help VMC update itself with the changes. If such shortcomings were overcome by incorporating necessary changes in its e-governance policy, VMC would continue to be a model to other city governments in various parts of the world. The local governments, which have tried to use ICT for service delivery, have just taken a first step towards e-governance. They have to go a long way before realising the ultimate objective of e-democracy and complete local e-governance. Concerted efforts have to be made to scale up faster and deliver value to the citizens.

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## KEY TERMS

**Desert Sections:** The sections of the Web site which did not have any appreciable number of visitors.

**Dormant Sections:** The sections of the Web site which have not been revised for a long time.

**Dynamic Web Sites:** Web sites which are updated frequently and visited regularly by users.

**First Generation E-Government:** E-government where only an electronic bulletin board with a very limited ability to allow transactions online exists.

**Home Page:** The first and opening page of the Web site.

**House Tax:** A tax levied on the houses/buildings including the adjacent vacant lands by the rural local bodies, *Village Panchayats,* in India.

**Property Tax:** A tax levied on the houses/buildings including the adjacent vacant lands by the urban local bodies such as municipalities and municipal corporations in India.

**Transactional Web Site:** It is a Web site through which complete transactions can be carried out by the users.

**Static Web Sites:** Web sites which have not been updated; hence, they are not active for a long time.

# Electronic Voting in Belgium

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## INTRODUCTION

Does representative democracy imply that there is … representation? What does one mean by *representation*? Looked at very generally, it means that the legislative (parliament and government) and executive (government) bodies represent the opinions of those who are represented.

The primary method for expressing opinions in democracies is by voting: the parliaments are made up of representatives that reflect the different trends of the opinion expressed by the vote (Avril, 1990). Universal suffrage is neither a historical fact nor a clear-cut contemporary feature. There have been, and there still are, individuals who are excluded from voting and universal suffrage (Rémond, 1999). For a long time, several European countries had representational parliamentary systems that were not democracies. We then experienced a *notabilization* of political relations (Deloye, 1997, p. 96). As Max Weber put it, one is not then living from politics but for politics (Weber, 1963). Several restrictions existed and still exist with universal suffrage. For many years, governments either slowed down or restrained access to voting.

Nowadays, the problems arise in new and really reverse terms. The question is more about knowing how to bring citizens back to the ballot boxes and in this manner to perpetuate the legitimacy of the democratic system. Indeed, voter turnout rates have been falling for the past 20 years (Blais & Dobrzynska, 1998; Delwit, 2002). In many European countries, abstention has risen in a straight line since the end of the 1970s right up to the present day. In view of this trend and considering the growing number of election choices for a priori nongovernment parties (Ignazi, 2003), several analysts and political leaders have been wondering about ways to curb this development.

In part, thoughts relating to *electronic voting* (e-voting) lie within this context (Birch & Watt, 2004). A certain number of academics and political leaders have been examining institutionalised restraints likely to improve the current state of affairs (Bowler, Brockington, & Donovan, 2001). Naturally in this framework, electronic vote is only one element amongst others. In this regard, Arend Lijphart has undoubtedly pursued this the furthest, since in 1997 he suggested (re)introducing compulsory voting in democratic states in order to respond to the sagging voter turnout (Lijphart, 1997, p. 11).

The will to reduce voter abstention was not the only issue at the origin of studies on the possibility of introducing or extending e-voting. The mobilization of new communication methods and technology for voting was also at issue. Particularly as the unfortunate vote counting experience in the state of Florida during the 2000 presidential election highlighted concerns about traditional methods of voting and vote counting (Jarvis, 2001).

This article will briefly discuss the issue of e-voting by looking at the response to the introduction of e-voting by Belgian citizens who used it. We will show the results of a major exit poll survey conducted on the occasion of the May 18, 2003, federal elections on Belgian's opinions with regard to e-voting. Two major issues were examined. To what extent was e-voting as it was used in Belgium considered as easy or difficult to use? Was e-voting commonly accepted or rejected by the voters who used it?

## BACKGROUND: THE BELGIANS AND ELECTRONIC VOTING

In 1994, the following provision was inserted in the Belgian Electoral Law, "The King can, by decree deliberated by the Cabinet, decide that, for electoral constituencies, electoral cantons or communes that he designates, an automated voting system should be used."[1] From that moment on, computer voting was introduced in more and more Belgian municipalities. In 2003, 44% of all Belgian voters cast their vote on a computer.

To a certain extent, the use of e-voting in Belgium may look surprising. In Belgium, voting is compulsory. Voters not attending at the polls may be sued. The first time, they risk to pay from 25€ to 50€, the second from 50€ to 125€. Even if sanctions are scarcely applied (0.0015% in 1985), most Belgians respect the rule and vote. In the last federal elections (2003), the turnout was 91.9% (decreasing of 3.25 percentage points in the last 15 years). In that context, one can hardly conclude that Belgian legislators introduce e-voting to curb a growing abstention. Actually, two reasons justified this choice. First, e-voting was going to avoid a large number of invalid votes. Second, legislators wanted to reduce the length of counting procedures.

Ten years after its introduction, time had come for a first evaluation of e-voting in Belgium. On May 18, 2003, a team of 27 pollsters supervised by seven researchers and professors from the Université libre de Bruxelles (ULB) went to 13 polling stations in the country[2]. In addition, two teams of pollsters went to two municipalities where the so-called "ticketing" method was being tried out, in order to improve confidence and, eventually, recount in case of contest (Kohno, Tubblefield, Rubin, & Wallach, 2003; Maynihan, 2004, pp. 523-524).

The questionnaire submitted at the polling station exit on May 18, 2003, was in three parts[3]. The first had a series of questions that enabled defining the socio-demographic profile of the individuals interviewed. This information has a twofold use. On the one hand, it enabled assessment of the value of the sampling in terms of representativeness. On the other hand, this data also permitted us to determine whether certain socioeconomic groups or certain age categories showed any specific association with e-voting problems.

The second part of the questionnaire contributed a second round of objective data on the profile of the persons polled. Its purpose was to provide the resources needed to assess whether familiarity with computers and the information received beforehand about this new voting system tended to influence the way voters felt about e-voting.

Finally, the last part of the exit-poll questionnaire contained questions asking Belgian voters if they were satisfied with e-voting. Four questions served as indicators of this global satisfaction. First, those polled were asked to evaluate how easy they found e-voting. Second, they were asked to express the social acceptance of the new voting procedure. The third item concerned trust in e-voting. Finally, their overall feeling regarding e-voting was asked.

## MAIN THRUST OF ARTICLE: ACCEPTANCE OF E-VOTING IN BELGIUM

### The User Friendliness of Electronic Voting

First of all, those polled were asked the user friendliness of e-voting. Before going into the answers, one should briefly state how Belgian voters have to proceed to cast their vote electronically.[4] In the poll station, each voter receives a magnetic card. The voter enters the polling booth, inserts his or her magnetic card, and starts the process. Using an electronic pencil, the voter chooses a party first, and then a candidate. Afterward, the voter has to confirm his or her vote. At the end, the voter gives back his or her magnetic card and his or her vote is recorded.

Knowing the details of e-voting in Belgium, we can move on to the analysis of the user friendliness of e-voting. Those polled were asked to evaluate the ease/

*Figure 1. Ease/difficulty in using electronic voting*

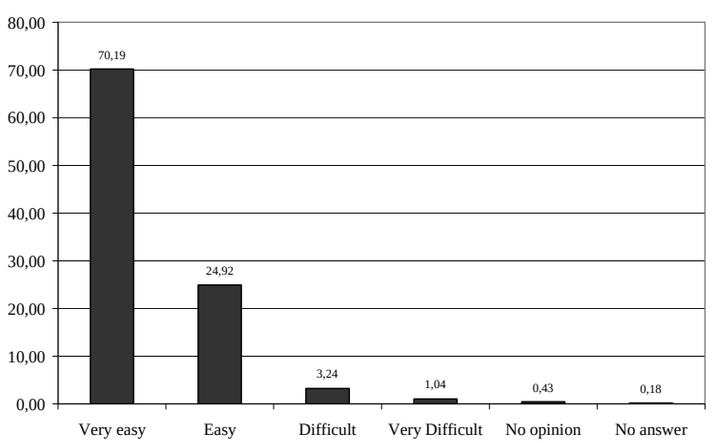
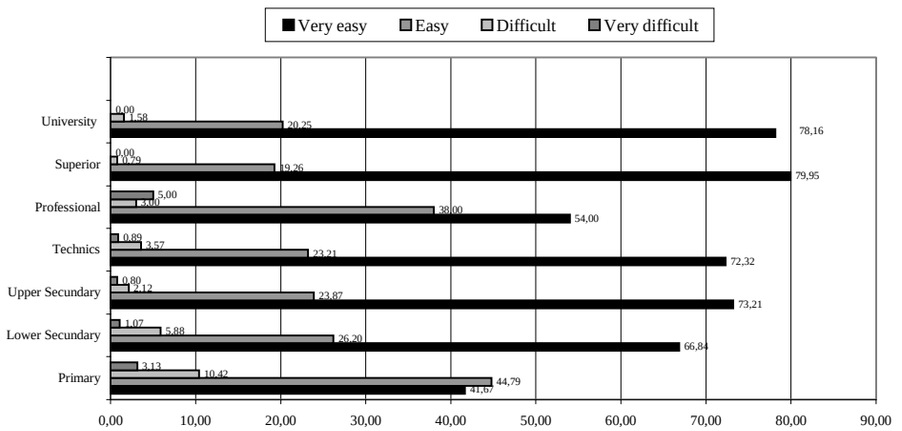


*Figure 2. Degree of ease depends on educational capital*




difficulty of use of e-voting by stating that e-voting as "very easy," "easy," "difficult," or "very difficult" to use. Looking at the figures, it seemed clear that if there was any criticism voiced by the interviewees about e-voting, the reproaches had nothing to do with the user friendliness of this method of voting.

Indeed, just under three fourths of respondents stated "very easy" for computerized voting. The positive comments relating to the actual operation of the e-voting mechanism even reached 95.11% if one adds the 24.92% of persons who noted "easy" to vote with computer. Except for a very small minority of 3.28%, a favorable opinion was given about the user friendliness of e-voting.

If one cross-checks ease of use with the educational background, one can analyse to what extent e-voting would be more accessible to the better educated. The data obtained in our research were able to confirm this hypothesis to a certain degree. Indeed, it was with respondents having greater educational capital (university and college qualifications) that the percentages of people who stated "very easy" for e-voting were the highest. In the two cases, it was close to 80% (78.16% for university graduates and 79.95% for those who graduated from colleges). Conversely, individuals with less educational capital gave fewer favorable answers. For example, it was only 41.67% with people whose final diploma was the one they obtained at the end of their primary school education (age 12).

*Figure 3. The matter of principle*

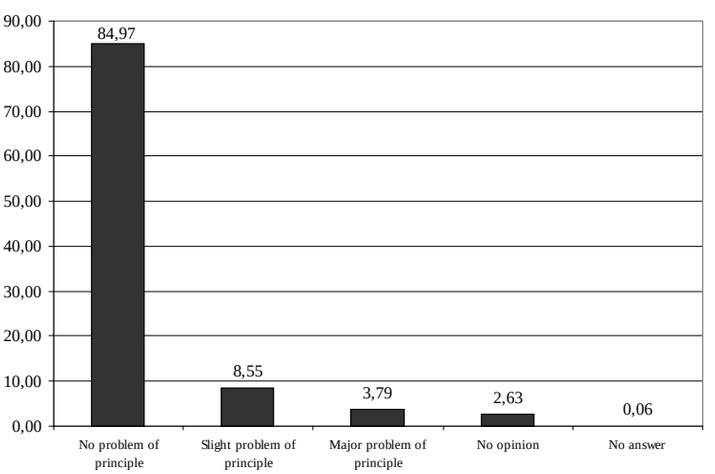
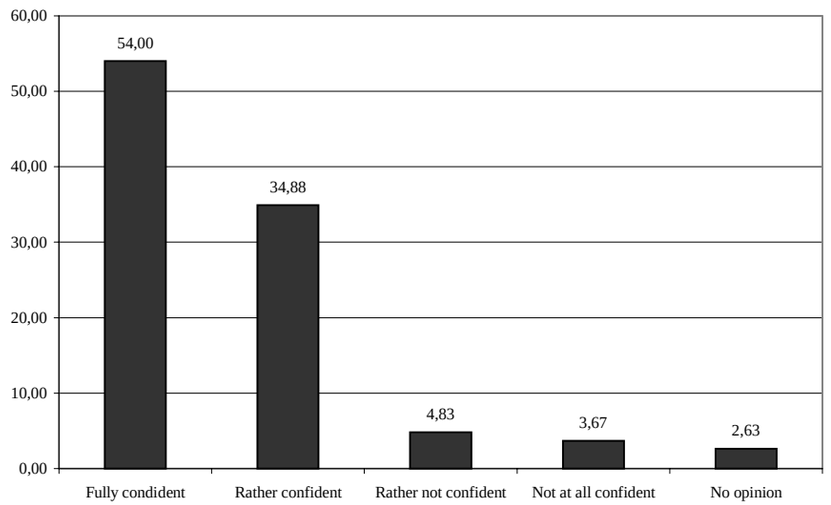


*Figure 4. Trust/mistrust in electronic voting*




## Societal Acceptance of Electronic Voting

The second variable tested was societal acceptance of e-voting. Here, it dealt with assessing within our sampling if e-voting posed any philosophical problems.

In order to assess if people interviewed had any complaints to make in this realm, an ad hoc question was put to them. It asked them to state if for them, e-voting was "a major problem of principle," "a slight problem of principle," or "not a problem of principle."

The figures are clear for the matter of societal acceptance of e-voting. By a very substantial majority (84.97%), the respondents stated that for them, the new voting method was not a problem of principle. The two other replies were only given by 12.34% of those questioned.

Therefore it clearly emerged that societal acceptance of e-voting was not a disputed issue within our sampling taken on May 18, 2003, at polling station exits.

## The Issue of Trust/Mistrust in E-Voting

The third and final question was about citizens' confidence in e-voting. The last variable is vital for establishing the legitimacy of computerised voting. As several authors have repeated, without this legitimacy, any wide-scale application of this method could be problematic.

Over the sampling as a whole, there was a majority feeling of trust toward e-voting. The favorable responses ("full confidence" and "rather confident") were mentioned in 88.88% of cases. Only 8.5% of those surveyed expressed mistrust ("rather not very confident" and "not at all confident") toward computerized voting.

The feeling of trust appeared to dominate to a large extent, although it was not without reservations. Indeed, a majority of respondents (54%) expressed complete confidence, but nearly a quarter of the sampling expressed qualified trust (34.88%). Thus there was now a different configuration than the one for the question on ease of use. For the latter variable, the proportion of qualified responses was much lower.

Just as with ease of use, it was interesting to cross-check this data on trust with several independent variables. The first run dealt again with educational capital. The first lesson learned was that no matter what the final diploma was, trust was expressed by the wide majority. In all cases, over 80% of respondents expressed complete or reasonable confidence in computerized voting.

Even so, some differences were noticed between the different levels of educational capital. Full confidence was highest in respondents with the lowest level of academic assets ("no diploma" [61.22%] and "primary school diploma" [60.22%]), as well as by individuals who took technical education (62.73%). Yet, the total for positive responses ("fully confident" and "rather confident") remained at around 80 to 90%, regardless of the educational capital.

The age category that least expressed "full confidence" (46.73%), the 30–39 year olds, was also the one in which the total number of confident respondents ("full confidence" or "rather confident") was the highest (91.9%). This clearly strange revelation reflected a broader trend in which it turned out that as the age of respondents increased, there was more "full confidence" but also more mistrust. The skeptical responses ("rather no confidence"

and "no confidence at all") were largely in the minority no matter what the age of the respondents. On average, we had rates of mistrust between 5 and 13%.

The age category expressing the least mistrust was the 30–39 year olds with 5.3%. At the other end, we found the 60-69 year olds for whom computerized voting raised a feeling of mistrust in 13.24% of cases. For the latter, as well as with the 70+ category, the answers "not at all confident" even reached 6.85%.

It seemed, therefore, that the oldest individuals, who were also those who had the least contact with computers and information technology, expressed comparatively more caution with regard to the new way of voting. The relationship between age and mistrust was not in a straight line, however. Indeed, the 30-39 year olds and those aged 50-59 were the categories in which mistrust was the lowest. In both cases, the mistrust rates remained below 8%.

Finally, what about the experimental tests with ticketing? The experiment conducted at the Waarschot and Verlaine polling stations increased confidence a bit but it especially altered its fundamental nature. Seventy percent of voters in these polling stations actually confirmed they had complete confidence in computerzed voting compared to 52% of voters in other stations. On the contrary, the number of citizens expressing some kind of mistrust was reduced to its most simple expression, 3%, compared to 9% amongst citizens voting in a different station. It did indeed seem that ticketing had a valued-added effect.

The preceding data showed that computerized voting gave rise to relatively few negative reactions on the subject of user friendliness, societal acceptance, and trust. Nonetheless, it was certainly advisable to wonder if the relationship to the new voting method was better or not as good as Belgian ties to the paper ballot. For this purpose, the questionnaire submitted at the poll exits included a question about confidence in voting with paper ballots.

A majority of respondents expressed their confidence in the paper ballot. Almost one third of them (32.19%) declared to have "full confidence" and 44.59% said they were "rather confident," which meant 76.78% positive responses. Negative responses were made by 17.26% of those polled (10.93% "relatively little confidence" and 6.29% "no confidence at all"). Finally, there were 5.93% with no opinion. Amongst the latter, one undoubtedly will find voters who have never voted with paper ballot.

Just as for e-voting, the confidence of those questioned was largely positive. Even so, it was expressed in a more nuanced manner than it was for the new voting method. The paper ballot received more "reasonably confident" than "fully confident." Conversely, 54% marked "full confidence" for e-voting compared to 34.88% "reasonably confident." Nonetheless, this comparison must be made with caution because it compared real circumstances—the e-voting done on May 18, 2003—with a past situation—voting with paper ballot—or virtual, notably in the case of the under 30s who may have never voted with paper ballot.

In short, the two voting methods inspired respondents' trust. Nevertheless, the confidence grades were more moderate for voting with paper ballot.

The positions with regard to paper balloting and e-voting could be cross-checked. The goal was to see if the positions vis-à-vis the former method were the same as for computerized voting. The figure below can be read in the following manner. The people who were completely confident about computerized voting are represented on the

*Figure 5. Trust or mistrust in the paper ballot*

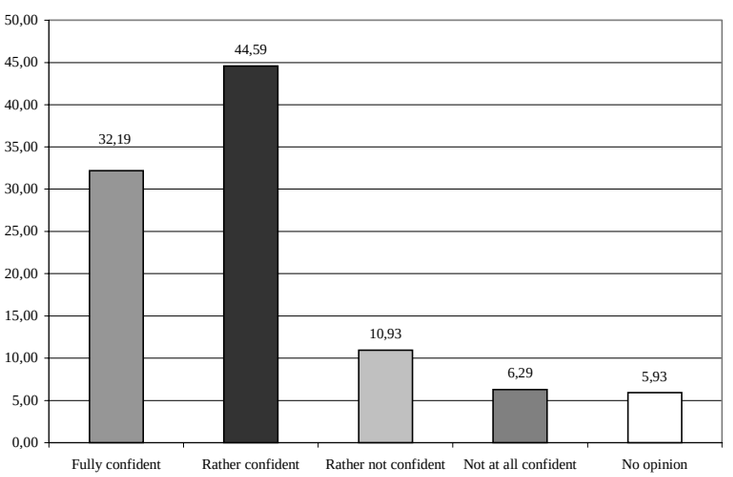


*Figure 6. Cross-checking of confidence in electronic voting and paper (colors for confidence in e-voting and columns for confidence in paper ballot)*

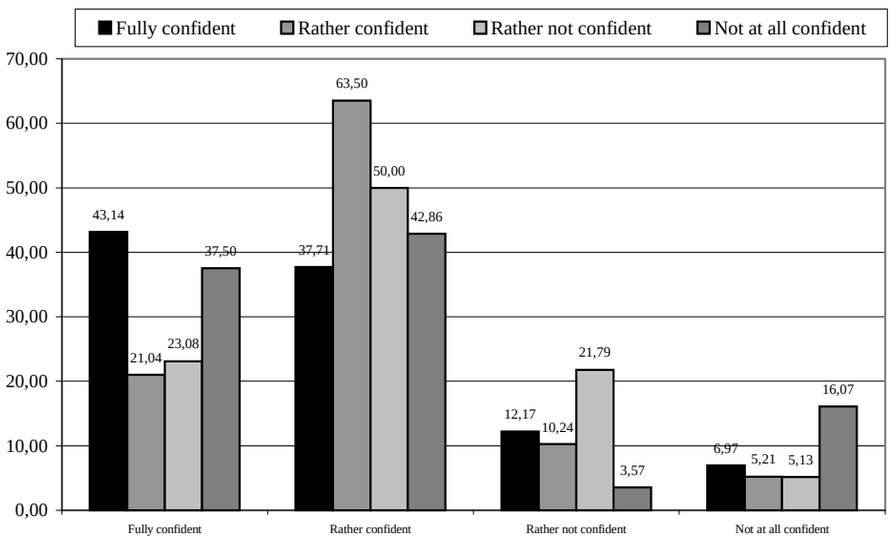
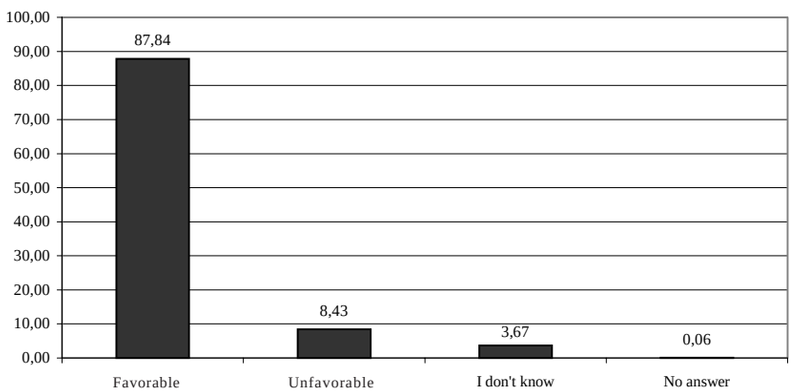



*Figure 7. Overall feeling regarding electronic voting*




black columns. These respondents were subdivided between the four answers on paper ballots and according to the percentages that are above the lines. The same logic applies for the other three colours (three shades of grey).

The people who placed full confidence in e-voting most often gave the response "fully confident" for the other voting method (43.14%). The response that was in second place was "rather confident" (37.71%). Mistrust was expressed moderately in 12.71% of cases and decidedly in 6.97%. Overall, the respondents who had complete confidence in e-voting also placed much confidence in paper ballots. Even so, less than half declared full confidence in both cases.

Amongst those surveyed who said they had "reasonable confidence" in e-voting, 63.5% were also "reasonably confident" in voting with paper ballots. The second case was "full confidence" with 21.04%. Then came "relatively little confidence" with 10.24% and "no confidence at all" for 5.21% of cases.

Three quarters (73.08%) of those interviewed who noted relative mistrust in e-voting were more disposed toward the former method. With the latter, the paper ballot obtained 50% of "reasonably confident" and 23.08% of "full confidence." Finally, 5.13% had less confidence in the paper ballot.

With the voters approached at the polling station exits who declared they had "no confidence at all" in computerized voting, they also found a certain preference for the old system. Thirty-seven-and-a-half percent had complete confidence in the paper ballot and 42.86% were "reasonably confident." Next, 16.07% had "no confidence at all" in either of the two methods of voting. Finally 3.75% of respondents in this category had "relatively little confidence" in the paper ballot.

In brief, two trends appeared. A majority of those who had confidence in e-voting also had confidence in the paper ballot, but in a more moderate fashion. On the other hand, with those who mistrusted the new method, it was generally through preference to the former technique.

The respondents' positioning toward e-voting was analyzed in detail according to three variables: societal acceptance, user friendliness, and trust. A fourth and more encompassing question was added to the questionnaire. It asked the respondents to state if in the end, they were or were not favorable to computerized voting.

A vast majority (87.84%) answered yes to this question. Less than 10% gave an unfavorable answer (8.43%). The percentage of nonanswers was 3.67%. As with the totality of questions, the opinions were positive with regard to e-voting. But one should keep in mind the nuances that surfaced with socio-demographics and voter familiarity with computers.

If we differentiate between voters from polling stations with ticketing system and the others, we once again observe a high level of acceptance. Nearly 92% of voters in Verlaine and Waarschot declared themselves in favor of computerized voting compared to 87% of surveyed voters from other polling stations. And only 6.6% had a differing opinion compared to 8.7% in the second category.

## FUTURE TRENDS

Considering the low level of mistrust in e-voting among Belgian voters in 2003, one can assume that the legislator would not restrain his or her desire to go farther in the application of this new voting procedure.

In previous years, politicians from several parties declared that they want to generalize computer voting in all Belgian municipalities. Only the *Parti socialiste* does not want implement e-voting in more areas. The first goal of the promoters was to have computer voting in all municipalities for the 2006 general elections. As it was not practically possible, they will try to do it for the 2007 federal elections or for the 2009 regional and European elections.

Actually, some even want to go one step farther by introducing Internet voting in Belgium. The current Flemish State Secretary Peter Vanvelthoven (SP.A) announced his project in October 2005. No decision has been made, but no one can say that it is never going to happen.

## CONCLUSION

In every representative democracy, the act of voting is without a doubt a stumbling block. Through it, citizens exercise their sovereignty; through it, they choose representatives, they exercise control over those in power, decide on societal projects. This multitude of functions fully demonstrates the importance of voting. Under these conditions, when the ballot box verdict loses representativeness, legitimacy, or credibility, it is the entire democratic system that grinds to a halt.

In the fight against abstentionism, institutional imposition is at the top of the list. This approach can lead to rather radical suggestions: the world-renown political science expert Arend Lijphart (1997) suggested (re)turning to compulsory voting. However, "more moderate" proposals are being examined. One of the key approaches aims at making voting easier.

This approach would involve making voting easier through a variety of improvements. In this way, voting would become simpler, which would have the knock-on effect of bring voters (back) to the polling stations, even if in reality abstentionists can be considered as being "in remission" from the voting system.

A few nuances should be added to this diagnosis. Some studies have well and truly shown that an evolution in voting methods can increase voter participation. Thus, Jean Blondel, Richard Sinnott, and Palle Svensson (1997) in particular plotted a higher rate of abstention in the countries where voting took place on a weekday than in countries where it took place on Sunday the 8th. Gimpel and Schuknecht (2003) have pointed out the importance of the ballot boxes' accessibility. But the main cause of the drop in voter participation did not stem from these secondary elements and basically reflected the significance of the election (see, for example, Reif, 1980).

Be that as it may, technical solutions to abstention were certainly the ones that gave rise to most of the legislative initiatives. At various levels, numerous countries experimented with technical innovations aiming at making voting *easier*. Among them, one, the electronic or computer voting is at the moment experienced at a large-scale level in Belgium, as it is in the Netherlands, Great Britain, the United States, and Brazil (Bourgaux, 2001). In Belgium, the first use of e-voting was made in 1991 in the villages of Waarschot and Verlaine. The trial was considered conclusive enough for the procedure to be expanded. At the last elections on May 18, 2003, around 44% of voters used the new method.

Nevertheless, such evolution in the process of voting is certainly not only technical. It can have several impacts on the reliability of the counting, on the secrecy of the vote, and also in terms of societal cohesion. Knowing that, the *Centre d'étude de la vie politique* of the ULB became involved in very extensive field research in 2003 (Delwit, Kulahci, & Pilet). Studies have included an "exit poll" conducted on May 18, 2003 (N = 1637).

The goal of this research was to analyze the social legitimacy of computer voting in Belgium by questioning Belgian voters. The hypotheses were that this new voting technology could affect the equal access to the right to vote. Four categories of polarization were presumed:

1. Between rich and poor
2. Between those who pursed higher academic studies and those who have minimum qualifications in academic terms
3. Between young and old
4. Between Flanders, Wallonia, and Brussels

In this concise contribution, we have given a brief presentation of the results of this survey. Looking at the figures, it seemed clear that if any criticism was made with regard to e-voting, the main concern of these reproofs had no connection with the user friendliness of this voting method. Indeed, a bit less than three quarters of respondents felt that they had used computerized voting "with the greatest of ease."

Generally speaking, the fact to have already voted by computer, but also the respondent's familiarity with IT, tended to promote to a great extent the convenience of e-voting. Apropos, modest elements of a *digital divide* were noted: there was an underlying trend for people with the lowest level of academic assets to encounter the most difficulties. These reservations only involved a minority of respondents, but the observation was verified by our exit poll and likewise for three target publics that we analyzed in a postelection survey.

At societal acceptance level, the exit poll results showed the absence of any major problems. By a very large majority (84.97%), respondents confirmed that the new method of voting did not pose any problems in principle. Societal acceptance of e-voting appeared to be contested just a little and not very strongly within the scope of our sampling taken on May 18, 2003, at the polling station exits.

The third dependent variable assessed was confidence in the new method of voting amongst Belgian voters. The favorable responses ("full confidence" and "reasonably confident") were expressed in 88.88% of the cases.

Looking at the cross-checking of certain socio-demographic data with levels of confidence in e-voting, some nuances can be established. Thus we could detect differences in terms of levels of educational capital. Full confidence was highest in respondents with the lowest one. Thus it was the opposite of the observation established for ease of use.

The second cross-checking carried out on the matter of trust/mistrust was the influence of age on the responses. Here, too, the great majority expressed confidence. In all age categories, more than 80% of respondents reported "full confidence" or "reasonably confident." However, it was noted that when the age of respondents increased, the attitudes with the most opposition increased as well: *those with complete self-confidence* and those *with deep-seated mistrust*.

The aforementioned figures show that computerized voting gave little rise to negative reactions in the realms of user friendliness, societal acceptance, and confidence. Moreover, we observed that in the Verlaine and Waarschot polling stations, where the ticketing experiment was introduced, societal acceptance and confidence in computer voting were higher than the average.

Without a doubt, and based on the data from this research using questionnaires, it is shown that the relationship of Belgian voters with e-voting is largely positive. Both in terms of ease of use as well as of societal acceptance, the surveys conducted recorded large rates of support in the new method of voting. The sole nuances to be added are expressed by senior citizens and youngest ones who expressed a more moderate level of confidence. Nonetheless, in no example did the negative opinions have the most replies. Societal legitimacy of the new voting method within the sampling of Belgian voters that this analysis is based on did not seem to pose any insurmountable problems for the interpretation of these results.

Naturally, these findings are at a *representation* level. They express the feeling of voters toward a (relatively) new method of voting. As such, they do not prove the absence or the presence of potential problems. But in the eyes of a clear majority of voters, e-voting on site at the polling station did not cause any particular difficulty with use and no specific concerns as to the tallying and announcement of the results.

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## KEY TERMS

**Abstention:** Number of registered electors who do not go to vote on the election day. In all Western European countries (except Denmark), abstention has increased for 20 years.

**Digital Divide:** Hypothesis whereby the use of IT in the electoral process would put certain categories of voters at a disadvantage. Certain social classes who are less familiar with electronic voting would be deprived de facto of their right to vote.

**Electronic Voting:** Technique by which electors vote by following the instructions on the screen of a computer installed in a pooling booth, instead of by using a ballot paper. (In this article, used as a synonym of computer voting, automatized voting, e-voting, or computerized voting.)

**Internet Voting:** Technique by which electors vote by using a computer connected to the Internet. This operation can be take place in a polling booth, via interactive kiosks installed in public places, or from any computer connected to the Web.

**Societal Acceptance of Electronic Voting:** In order to assess if the persons interviewed had any complaints to make in this realm, an ad hoc question was put to them. It asked them to state if for them, electronic voting was "a major problem of principle," "a slight problem of principle," or "not a problem of principle."

**Ticketing:** Word commonly used in Belgium for *voter verifiable paper audit trail (VVAT).*

**Trust in Electronic Voting:** Voters were asked to declare if they were "fully confident," "rather confident," "rather not confident," or "not at all confident" in electronic voting.

**User Friendliness of Electronic Voting:** In the survey conducted on the occasion of the 2003 federal elections, Belgian voters were asked to evaluate the ease/difficulty of use of electronic voting by stating that electronic voting as "very easy," "easy," "difficult," or "very difficult" to use.

**Voter Verifiable Paper Audit Trail:** Experiences where a voting ticket is printed by the computer and collected in a sealed ballot box, in order to improve confidence in electronic voting and, eventually, recount in case of contest.

## ENDNOTES

1 Loi du 11 avril 1994 organisant le vote automatisé, article 1er.

2 Four in rural areas (Lens, Asse, Waarschoot, and Verlaine), two in suburban areas (Seraing and Sart-Tilman) and seven in urban areas (Bruxelles-Ville, Saint Gilles, Jette, Anvers, Borgerhout, Anderlecht, Liège centre). All are municipalities where e-voting is used. In Waarschoot and Verlaine, a system of voter verifiable paper audit trail (VVAT) was tested.

3 Finally, the sample is composed of 1.637 voters, 51.93% are men, and 55.07% are professionally active. The age scale is as follows: 18-29 years (21.69%), 30-39 (19.24%), 40-49 (17.03%), 50-59 (14.83%), 60-69 (13.85%), 70+ (13.36%).

4 http://elections2004.belgium.be/fr/automated_voting.html# In the bilingual regions, the voter must choose a language (Dutch, French, or German) before voting.

# Electronic Voting Machine

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## INTRODUCTION

Electronic voting, as well as Internet voting, is in the process of being incorporated into most democracies in the world. The literature on the topic is abundant as well as the technologies offered. Most of the work, nevertheless, seems to bypass the actual origins of the modern (and current) electronic voting systems (Oudenhove et al., 2001).

## BACKGROUND: WHAT IS A DOMINANT TECHNOLOGY DESIGN?

The emergence of a dominant technology design is very important for functioning public services. The citizens must have in mind what is acceptable or not. The perception of a machine as being the way it should be is fundamental; otherwise, the system will not have credibility. For example, we know how a typewriter (and now a computer) has to look like thanks to Remington. It is important to understand that to follow a dominant technology design is not just copying a machine. The importance is the psychological perception of what the machine should be. A vehicle with five wheels will not be described as a bicycle. The same is true of fax devices, flight simulators, and cardiac pacemakers (Murmann & Tushman, 2001). It does not mean that the design is the most efficient, as the case of the QWERTY keyboard illustrates. The dominant technology design for electronic voting machines, as James Utterback (1996) has defined it, was developed in Brazil in the late 1980s and early 1990s. Basically, an electronic voting machine that does not follow the Prudêncio design runs the risk of not being credible as a voting machine.

## THE EMERGENCE OF THE PRUDÊNCIO DESIGN IN ELECTRONIC VOTING: THE INTERNATIONAL TECHNOLOGICAL CONTEXT

Electronic voting implies the existence of machines to intermediate the process of individual political choice and the collective choice of leadership. It implies by necessity that the electronic system will be safer, more cost effective, and faster than nonelectronic systems.

Most technologies now implemented in Brazil have been preceded by both theoretical and/or fictional suggestions of electronic voting. Computer-supported voting systems, such as the EMISARI, were operating in 1970 even though they were more predecessors of conference systems than voting systems. Among those involved in theoretical discussions of the 1970s, we have Buckminster Fuller and Tomas Ohlin (Oudenhove et al., 2001).

The first systems to enter operation were off line (Barlow, 2003). In fact, one of the first patents for electrical voting was proposed by Thomas A. Edison in June 1869 to be implemented in the U.S. Congress. Mechanical voting systems were proposed in many parts of the world in the late 1890s and were used in the United States in 1892 at Lockport, New York. When mainframe computers became accessible, they were used for tabulation and vote counting. Punch-card technologies were a common feature of democracies in the 1960s. Mechanical voting machines became dominant in the United States in the 1960s. Off-line machines with card readers were also proposed. Criticisms and fear of fraud favored the introduction of optical readers in some corners of the Earth in the 1970s, but the accuracy problems persisted (United States Federal Election Commission, 1998). A survey in the United States in 1984 indicated that 28% of the systems used for vote counting could generate errors.

The great challenge now is the introduction of online systems as well as mobile telephone systems for direct referendum of proposals by politicians, a form of direct electronic democracy. Online systems have existed since the 1970s for research and survey purposes. One example was the Electronic Town Meeting tested in New York in 1973. The French Minitel system was used also for research and surveys in the 1970s. Informational voting was carried out through the Minitel to survey the needs of the public and improve on public administration. Similarly, telephone surveys and voting by groups of citizens, such as in 1973 at Wuppertal, Germany, were also carried out. With the World Wide Web, all the surveys became, in practice, of general access and participation. Security protocols have made it possible for organizations, even political parties, to carry out elections through the Internet. In 2000, Internet voting was implemented in Alaska, but only 35% of the voters opted for the Internet.

The problems of the 2000 U.S. presidential election gave a global push for electronic election systems. To address the problems and find solutions, the Help America Vote Act of 2002 (HAVA) created a federal commission that is looking into the matter (Wysong, 2004). At the same time the world was wondering about the validity of the U.S. voting system, Brazil was once again carrying out successful electronic elections. The 1998 Brazilian elections had already 57% of the voting population on the electronic systems.

Most of the problems, including the introduction of malicious codes into the voting system, have been surveyed and described in detail by Bev Harris in the book *Black Box Voting* (Black Box Voting, 2005). Most of the issues raised are being addressed by the companies manufacturing the voting machines. Nevertheless, the close association between the leadership of these companies and political organizations has created doubts in the minds of voters. Most of these doubts, if not all of them, are not well founded but must be mentioned. For instance, the most important producers in the United States are Sequoia Voting Systems (2005), Election Systems and Software (2005), and Diebold Election Systems (2005). The key person of Election Systems and Software is Michael McCarthy, who is also a campaign finance director of a U.S. senator. The key person of Diebold is Wally O'Dell, a known important supporter of United States President George W. Bush. Such interfaces between political influential persons and the voting machine producers may raise doubts, although an independent verification service can easily address the issue of credibility.

## THE EMERGENCE OF THE PRUDÊNCIO DESIGN IN ELECTRONIC VOTING: THE BRAZILIAN TECHNOLOGICAL CONTEXT

It is interesting that some standard measures taken in Brazil have not been taken in all places in the United States (Internet Policy Institute, 2000; Mercuri, 2002, 2005). The machines are kept secure at all times. Machines cannot be tampered with. Before their deployment, each machine is tested and in addition, there are standby teams to solve problems or even replace machines. The pool workers are properly trained. The machines generate records that can be verified, and the whole process is transparent. That certain problems have occurred in the United States and not in Brazil says more about the nature of the democratic processes in both countries. It is also revealing that the Diebold voting machines that are distributed in Brazil have had no problems, while 14,000 of them had to be recalled in California, United States, in 2004. Further verifiability is being introduced in Brazil, placing the country once again further ahead in relation to the rest of the world (Rezende, 2004).

By 2000, 109 million persons were voting electronically in Brazil in a system that could bypass problems of illiteracy and problems such as the lack or instability of the electricity system. The system is designed to overcome the digital divide. By the October 2002 presidential and general elections, the electronic system had reached all voters, proving that electronic democracy was possible, feasible, and verifiable (Östberg, Santhias, & Cabral, 2002). Throughout the country, 19,000 candidates raced for a public position in a country with an income-distribution nightmare, unequal educational opportunities, and wealth opportunities still open.

The whole process started in the southern state of Santa Catarina in a city called Brusque (Santhias & Cabral, 2002). Santa Catarina has some 5.5 million inhabitants with their roots in Italy, Germany, Portugal, Poland, Africa, Japan, and the Ukraine. The cultural diversity necessarily implies that general solutions have to take into account a variety of factors in order to be accepted. In 1989, a judge, Carlos Prudêncio, assisted by his brother Robert Prudêncio, an informatics expert, created the first machines with the design that is today accepted as the way a voting machine should be. It was tested at the 90$^{th}$ electoral district with 373 voters. The test was carried out without formal authorization of the national bureaucracy. It was an act of civil disobedience that shaped the democratic future to come. After the successful test, Carlos

Prudêncio approached major manufacturers in electronics and informatics, but he received no support. Instead, he continued to develop the technology and expand the number of tests. But, with the support of the National Electoral Higher

Court of Brazil at the city of Xaxim's elections of February 12, 1995, the system was ready. From then on, it was gradually implemented in 1996, 1998, and 2000. The further implementations were carried out with the support of the Brazilian National Institute of Space Research and the Brazilian Armed Forces. The technology was then passed to major manufactures and the design became the standard design in the world. Even machines that use touch screens follow the shape and form designed by Carlos Prudêncio. The improvements that now happen are incremental. Whenever one votes with an electronic voting machine, it is the Prudêncio design that is seen. One example is the Diebold AccuVote (*Diebold AccuVote-TS*, 2005).

Events in the 2002 Brazilian elections indicated how effective the system had become. The elections were surveyed by international observers from Panama, Mozambique, and the United States. Some 10% of the voters, because of illiteracy and a lack of schooling, did not feel at ease with the voting machines but were properly instructed by staff in place. Of the 400,000 electronic voting machines, 4,163 had minor problems that were fixed in a short time. One hundred eleven machines had to be replaced. This means that 1% of the machines had problems that needed to be addressed. The problems were solved so fast that no major delays in the election process occurred.

## THE PRUDÊNCIO DESIGN AS A DOMINANT TECHNOLOGICAL DESIGN

The simplicity of the design introduced by Prudêncio made it a standard. Machines must have an identifier of the candidate. In the case of a referendum, the voter has the option of voting yes or no. There is a display associating the names of the candidates to their numbers on the ballots. A key or button to confirm the choice is also available. After confirmation, there is no possibility of voting again. An interface for blind people is also made available. The names of voters are associated to each machine. Thus, those that do not belong to the machine cannot vote. This list of voters may be in a list or in a separate machine, but it is stored in such a way that a voter and his or her specific vote cannot be associated. In time, the codes for the programs used in the machine will be posted and open. A verification that the person has voted (but not indicating whom the person voted for) can be made available. Anyone looking through the plurality of voting machines now offered in the global market, including the ones that have had problems and have been criticized, will notice that they follow the elements above. The references in this text present several cases.

## CONCLUSION

In all phases of the process, creative inputs from the population were taken into the system, providing natural feedback that, in itself, became a participatory democratic process. Current developments include the test of smart cards for voter identification. Distance voting is also under discussion. In Brazil, there is resistance against distance voting. One of the guarantees of Brazilian democracy is that voters are protected at the voting site by public officials and by representatives of all interested parties and candidates. It would not be possible to offer such protection during distant voting. The system requires that voting has to be secret. Such issues are sensitive and educational programs on voters' rights have been established in order to critically follow the process of change. At the same time, the electoral system in Brazil maintains its independence and has kept the function of constantly testing the machines. It shows that the electronic machines are part of a system. By themselves they are no guarantee of democracy. That the dominant technology design by Prudêncio emerged in Brazil is a sign of the country's advancement. It is the Prudêncio design that spread and was adopted by U.S. manufacturers. It is the way a voting machine has to look like; otherwise, the voter will not consider it credible.

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## KEY TERMS

**Automated Election:** An election that uses voting machines.

**Dominant Technology Design:** A system, quite often with several subsystems, with mechanisms and components. Some subsystems may be part of a technological core on which whole industries depend. While subsystems may change, the total dominant technology design may continue: One may change propellers into jets, but the airplane will still be an airplane.

**Electronic Election:** Automated election that uses computers.

**Election Process Information Collection (EPIC) Project:** A project that compares voting operations, election systems, management, and administration. The Brazilian voting situation can be compared with that of other countries, thus indicating the advances of the country where electronic voting was first successfully introduced (http://epicproject.org).

**Internet Election:** Online election in which the link occurs through the Internet.

**Online Voting:** Electronic election in which computers are linked in a network.

**Prudêncio Design:** The electronic voting system developed in Brazil by Prudêncio. Basically, a voting machine that does not have the general components proposed and presented by Prudêncio is not perceived as an acceptable voting machine. Typically, it has a panel with voting information for output, and keys (numbers, names, or voting instructions) for voter input.

# E–Moderation in Public Discussion Forums

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## INTRODUCTION

Very little has been written about the crucial role of the moderator in public discussion forums or discursive communities. Group theory tends to draw upon group experiences from non-moderated groups such as criminal juries or groups convened for the purpose of observation. Therefore group theory is concerned with group members' behaviour that is not affected by intervention by someone with the overall process in mind. Practicing moderators and process designers understand the importance of this role in face-to-face consultation. The translation of these skills into an online environment is the subject of this article.

Unfortunately those who write about e-democracy rarely mention this important function, focusing instead on the technology, even though the moderator role is increasingly employed, for example in online collaboration or decision-making. The role of the e-moderator or e-convenor has attracted some attention, both in public deliberation circles (for example, National Issues Forums in the U.S.) and tertiary education (Salmon, 2002). Understanding e-moderation requires an appreciation of moderation per se. This article draws on input from a network of professional facilitators (in Australia, Canada, the United States, and the UK) who were asked by the author (in November 2004) to describe the qualities of an effective facilitator/moderator in a face-to-face (F2F) environment. Their combined responses, previously unpublished data, are used in this article. This primary data is combined with the author's own critical reflections based on 20 years of experience as a group facilitator and is integrated with the writings of theorists and practitioners.

## BACKGROUND

The terms facilitator, moderator, and convenor have been used interchangeably so far. Facilitator is a term favoured in Australia; the U.S. uses moderator to mean the same thing: the person who facilitates or makes easy the work of a group. When using the term moderator, Australians usually mean a person who is engaged in conflict resolution or controlling a heated debate. In the UK, the terms e-moderator and e-convenor are routinely used. In deference to international differences, the term moderator will be used to describe someone appointed to facilitate group deliberations.

An e-moderator is used in a variety of circumstances, for example the author has experienced e-moderation when groups are: engaged in online learning, developing organizational policies, organizing international conferences, functioning collaboratively as a decision-making body, for example, as the board of a professional association or research group. The role no doubt is used beyond these specific purposes, but this article focuses on discourse communities—in particular, groups convened for the purpose of discussion or deliberation (the latter denoting a movement toward common ground or decision making). This would not include asynchronous or synchronous chat rooms or e-mail discussions. The following commentary focuses on online forums.

It should also be noted that it is possible to engage in public deliberation *without* an e-moderator. This seems to occur when deliberation is emphasising direct democracy or transparent decision making or voting. For example, the 1062.org site offers a method for putting forward propositions that become subject to comment and can be modified by their author, culminating in a vote. The process is deliberative to the extent that an individual proposition becomes the subject of a ping-pong exchange (a "back-and-forth volley" in Isaacs' language (1999, p. 365) with people thinking alone but contributing these thoughts to a pooled propositional/voting process. However, direct democracy of this kind is unlikely to satisfy those who are disgruntled by existing political practices in developed countries (see Coleman & Gotze, 2001), so deliberative democracy is the focus here.

It is possible for an e-moderator's duties to be limited to receiving information or censoring or filtering. However, for the purposes of this article, where public discourse is paramount, the emphasis is on an e-moderator as a manager of discussion or deliberation. The e-moderator is seen as contributing "to the interactivity and openness of discussion" (Edwards, 2002, p. 3). In Edwards' language, the e-moderator can be seen as a "democratic intermediary" (2002, p. 3), at least in government-led discussions, and his research reminds us of the importance of transparency for those assuming the moderator role.

*Table 1. Attributes of an effective (face-to-face) moderator*

| | |
|---|---|
| **PERSONALITY** | |
| Must like people and be fair. | • |
| Can handle emotions of others by being non-defensive and non-blaming (is self-differentiated). | • |
| Is impartial, respectful, enthusiastic, encouraging, reflective, inquiring, patient, sensitive, and compassionate. | • |
| **LISTENING/COMPREHENDING/OBSERVING** | |
| Good listener who is in tune with people—hearing what they say. | • |
| Hearing what participants are trying to say or not saying. | × |
| Listens for more than the words and includes those who would otherwise be silenced or marginalized. | • |
| Has great powers of observation (antennae always up). | × |
| Can distinguish key issues from key passions. | • |
| Puts in lots of effort in planning. | • |
| Appreciates all contributions including those listening well. | × |
| Needs to be able to spot the unasked questions and unspoken assumptions. | • |
| Able to draw out connections between ideas (good comprehension skills). | • |
| Can articulate what is happening by naming common ground and areas of difference. | • |
| **GROUP PROCESS** | |
| Be willing to adapt their own facilitation style to match the group's needs. | × |
| Has many tools at his/her disposal (which means they can be flexible). | × |
| Becomes less visible as participants interact with each other. | • |
| Is flexible and responsive and works with a light touch. | • |
| Keeps the meeting to time. | × |
| Understands the particular context. | • |
| Employs good documentation skills so a record exists. | • |
| Welcomes difference and seeks to bring people to a position they can all accept. | • |
| Sums up contributions in such a way that people feel heard. | • |
| Can firmly interrupt domination and inappropriate power relations (using the group's own code of conduct). | • |
| Understands the problem/issue/challenge. | • |
| Makes sure everyone in group understands challenge. | • |
| Guides/supports/assists group to solve it. | • |
| Demystifies concepts, processes, and strategies. | • |
| Helps the group find the resources it needs to ensure everyone can participate fully. | • |
| Can laugh easily and bring lightness to the discussion; encourages shared humour and a relaxed environment. | × |
| Introduces people and creates friendly atmosphere to encourage full participation. | • |
| Inspires confidence and helps a group do its best thinking without imposing his/her own opinions, ideas or biases. | • |
| Creates the space for synergy and creativity. | • |
| Can stimulate dialogue that leads to shared learning. | • |
| Creates a sense of achievement and satisfaction for most participants. | × |
| Makes it look easy! | • |

Code: **• = possible or easy electronically** **× = not possible or quite challenging (electronically)**

When working F2F, the skills of an effective moderator are obvious. Table 1 is a summary of the attributes that were extracted from professional facilitators in Australia, the U.S., the UK, and Canada. There were many similarities in responses and general agreement that an effective moderator enables a productive conversation to occur because s/he understands how groups operate and can manage the complexities and pitfalls that are usually encountered.

One of the oft-cited descriptors of a poor moderator in this previously-unpublished study was a lack of awareness of one's own biases and opinions and an understanding of how this affects the group. Neutrality was considered an essential attribute. Many skilled moderators listed qualities that they freely admit are beyond the reach of mere mortals—almost "superhuman" or saint-like qualities that these moderators saw as an ideal. However, it is possible to discern attributes that could be acquired through learning and practice and also to detect those that would be quite challenging without the benefit of seeing, hearing or sensing the group members. These challenges are addressed in the next section, paying particular attention to those attributes which are marked × in Table 1. The assignment of adot or cross is quite subjective, based on the author's own experience, and other moderators would (and have) disagreed with some of these choices.

## E-MODERATION'S CHALLENGES

Skilled F2F moderators speak with confidence about a group's energy. One moderator described it as the *fuel* that takes a group on its defined journey. This energy is palpable and very difficult to detect electronically. Ricardo Blaug (1999) speaks of a highly-charged group as one in which democracy *breaks out* and the characteristics are easily spotted in a noisy, deliberative space: everybody is animated and talking or they are leaning forward and listening to each other, there is real exchange, leadership is very fluid as people assume leadership or relinquish it when it becomes appropriate, they insist on others being heard, conflict is constructive and workable.

### Personality

Groups can include difficult people, sometimes with severe personality disorders. A skilled moderator becomes remarkably astute at being able to spot a group member who is going to be problematic for others and can, with the group's support, create guidelines that a group can live with and then insist on following these rules when they are broken. Problems can be aired and resolved with relative ease. This is especially helpful with group members who insist on dominating the conversation and is also helpful for those who engage in social loafing. These difficulties are remarkably difficult for the e-moderator to control electronically, although individual participants are able to avoid the dominators with ease by simply switching off. The electronic medium does have the advantage of enabling censorship should language become threatening or abusive.

Skilled F2F moderators love to share humour in a relaxed environment. Laughter can bring lightness to a tense or heated discussion that other behaviours cannot. One of the most serious deficiencies of electronic media is a sender's vulnerability to being misunderstood, and humour (especially irony) is the first casualty; it results in a laughter-deficit that no amount of smiley faces can overcome.

### Listening, Comprehending, Observing

An e-moderator faces a major challenge when silence or reticence occurs. He or she has no way of knowing if the group member is bored, ill, dead, sulking, indifferent, or listening attentively. In a F2F group, death is easy to detect (!) and so too are negative or indifferent responses to discussion. A F2F moderator can draw out the opposing views or wounded psyches and this can provide an excellent pathway to empathic listening. A skilled F2F moderator can also assist a stumbling or reluctant speaker to find his or her voice by drawing out what they want to say but are fearful of, or resistant to, saying. One respondent described this as having one's *antennae always up*, an immense challenge with electronic communication, where misunderstanding is more routine than clear expression.

Silence in a F2F group is not a problem and can be useful for deliberations. The group member who is listening attentively without a need to restate views that have already been expressed or one who listens acutely in order to synthesise the discussion is a valued group member. The e-moderator is cast in this role in a discursive community and cannot respond to a silent members' body language (especially facial) that gives clues about how to proceed.

### Group Process

F2F moderators have a decision-making or discussion-generating toolbox at their disposal. A skilled moderator can flexibly adapt his or her style to match the group's needs. The group might need an analytical tool to uncover "argument repertoires" (Cappella, Price, & Nir, 2002), or a micro-process to uncover values, or a trust-enhancing exercise when the situation becomes tense. Participants might need to have all of the options visibly displayed so that they can be tested, to eliminate those that are out of favour. This requires a quick response in real time and cannot work if input is asynchronous and divergent. Of course, an e-moderator can send people to caucus using a separate thread or their own e-mail discussion, and online decision-making tools can be remarkably quick. The existence of e-mediation also suggests that quite sophisticated conflict resolution tools may be possible for electronic employment.

Because of the synchronous nature of F2F deliberations, considerable ground can be covered very quickly. One statement might be deemed acceptable by many nodding heads and the group can readily, silently move to the next proposal and the next. Common ground can be sought relatively expeditiously. F2F moderators can begin a discussion with a group, collectively define the group's goals, help them achieve those goals, then finish on time and everyone can go home. The discussion is bounded and persists only if the process has factored in ongoing dialogue. The doors can be firmly closed as the last person leaves and this defined time frame works well for busy participants and moderators.

Further, the author's photographic archives probably resemble those of other F2F moderators, with laughing groups captured after the final sessions of various deliberative, inclusive processes (deliberative polls, consensus conferences, citizens' juries, youth juries). These images show satisfied, empowered participants

with arms flung high, beaming broadly with collective satisfaction and achievement writ large. It is very difficult to imagine a similar circumstance arising from an online discourse community which is hampered by asynchronicity and privateness.

## MEETING E-MODERATION'S CHALLENGES

There are important lessons to be learned from the previous challenges and admissions to be made. E-moderation in its 2006 form is an imperfect dialogic process for group dialogue or decision-making but it can be done well if certain principles and actions are employed. It will be clear from Table 1 that *many* of the attributes identified by skilled F2F moderators can find electronic expression.

### Listening, Comprehending, Observing

Synchronous discussions (including synchronous chat rooms), overcome some of the disadvantages of asynchronous chatting. They have the advantage of assisting an e-moderator to "read" participants' emotional energy because the e-moderator is able to gauge the mood of participants through the speed of their responses. The chosen language can suggest mood to the extent that it indicates informality, for example, through informal banter or use of abbreviations like *gr8* or *lol* or *wdym*. The chosen language can also indicate the existence of a ghetto of like-minded people, especially if *lol* has always meant *little old lady* and is now found to mean *laughing out loud!*

### Group Process

Hootstein (2002) considers that an e-moderator wears four pairs of shoes (i.e., has four distinctive roles: *instructor, social director, program manager,* and *technical assistant)*. Hootstein's *footwear* resembles that which is worn by F2F moderators. The *instructor* operates as all good instructors do, using "self-directed learning in problem-centered environments," providing information, ideas, and connections between ideas. This is fundamental to all F2F dialogue and was identified in Table 1. The *social director* fosters collaboration or "social interactions based on consensus building and cooperation," attributes that arise repeatedly in Table 1. This might mean using small group exercises or the sort of exercises that were described above in F2F environments. The *program manager* is "responsible for organizational, procedural, and administrative duties" and is therefore a good planner who makes it look easy. *Technical assistants* help participants with "systems and software" and "resolve any technical difficulties that may occur." Hootstein warns that the "more familiar facilitators are with the technology, the more they can focus on learners rather than technology." This issue of *inspiring confidence in the process* was identified as essential by skilled F2F moderators.

Salmon (2002) offers a similar and overlapping model of online networking with her five-step model of interactivity which progresses through access and motivation (welcoming and encouraging), online socialization (familiarizing and providing bridges between cultural, social and learning environments), information exchange (facilitating tasks and supporting use of materials), knowledge construction (facilitating process) to development (supporting, responding, and reflecting) (p. 10-36).

Online practitioners (e-moderators and participants alike) know that discourse communities can only be established and maintained through considerable planning (much more than is necessary for F2F discussion). Discussions need to be tightly focused because otherwise excessive, irrelevant material is generated that is difficult to track. Online discussions have the advantage of producing a transcript and the disadvantage of having every word irrevocably recorded. This does not happen with F2F unless audio or videorecording is used. The goal and context must be clearly defined (why we are here and what we are going to do), the process should be transparent (how we will engage in conversation and what the effects of deliberation will be), questions must be straightforward and not vulnerable to misinterpretation, and complexity should be introduced only gradually. It is also helpful to think in advance about how the online group will know if it is making progress—just as it is for a F2F group to think in this way.

It helps to specify time lines and to allocate very specific requirements with clear consequences (for example, if A does not respond by X then we will proceed to Z). It also helps to distinguish between public and private spaces. To interrupt inappropriate commentary, a private e-mail conversation would be more appropriate than engaging in public discussion which merely inflames an already volatile situation. Of course, a more restricted e-mail dialogue is also susceptible to flaming. Online discussions are very public affairs and decisions need to be made about the shelf life of the exchanges. Are they removed after a period of time? Can participants modify or delete their own contributions? These decisions should be made well in advance and it is the e-moderator's job to clarify these important matters.

As with F2F moderation, one does not have to be an expert to moderate effectively online. Process is far more important than content; probing deeply is more helpful than adding to the existing body of opinions. National Issues Forum (NIF) favours deliberation over debate and

*Table 2. National Issues Forum's basic questions for deliberative forums*

| | |
|---|---|
| 1 | **What is valuable to us?**<br>Qs: How has this issue affected you personally? What is appealing about this option? |
| 2 | **What are the costs or consequences associated with the various options?**<br>Qs: What would result from doing what this option proposes? |
| 3 | **What are the tensions or conflicts in this issue that we have to "work through?"**<br>Qs: What are the "gray areas"? What remains unresolved for this group? |
| 4 | **Can we detect any shared sense of purpose or how our interdependence is ground for action?**<br>Qs: What trade-offs are we willing/unwilling to accept? What are we willing to do as individuals or a community to solve this problem? |

its suggested questions are the type of questions that work well in a deliberative space. Table 2 shows the four basic questions NIF suggests for a deliberative forum and some sample questions.

One quality that was identified by skilled F2F moderators during the author's study was the ability to synthesise, to draw out connections, to sum up contributions, to create the space for synergy and creativity. The forum e-moderator has the benefit of quiet, reflective time to achieve this onerous but stimulating task. It does not have to be done on-the-run as it is for F2F; the moderator can carefully alert participants to the existence of common ground as well as the major (possibly unresolvable) differences that have unfolded.

In a learning environment (higher education, social change organizations, public deliberations, etc.) it is essential that e-moderators (like F2F moderators) should be trained with that specific task in mind. The National Issues Forum offers excellent moderator's guides for those leading a group's inquiries in relation to contentious issues. Some organizations offer an eModerators Course (Hansard Society, UK). It is equally important that participants undergo orientation as well and organizations like Oxfam offer tips for online conversationalists to ensure that the discussion works well (Oxfam International Youth Parliament, c2004).

## FUTURE TRENDS

Discourse organizations are growing throughout the world (Ryfe, 2003). Many concentrate on F2F dialogue (e.g., Danish Board of Technology's consensus conferences), some online only (e.g., Web Lab's small group dialogues) and others combine the two (e.g., America Speaks' 21st century town meetings). It seems that public deliberation in all its configurations is growing, with citizens developing a taste for active, deliberative citizenship (Coleman & Gotze, 2001). As usual, the state lags behind but it will surely follow. Work is being done by scholars and practitioners to ensure that deliberative, inclusive processes are sufficiently rigorous to withstand critique (Gastil & Levine, 2005). One example of this is the international researcher/practitioner workshops that are convened bi-annually by the Deliberative Democracy Consortium. These trends: the growth of organizations dedicated to undertaking public deliberations and the testing of the efficacy of their work are trends to watch.

Perhaps, too, the nature of online deliberation will provide that reflective space that is often missing from F2F deliberation and the broader political landscape. More critically reflective practitioners will emerge if participants take the time to ask the type of questions posed by NIF (see Table 3).

Text-based deliberative exchanges may offer a benefit over F2F groups in relation to reflective practice. Participants can be encouraged in advance to reflect quickly and simultaneously because text exchanges, by their very nature, place the deliberation in front of participants' eyes. However, this still requires tremendous skill: to craft reflective questions and to establish the right atmosphere where participants feel able to respond. Online participants reflect with an immediacy that cannot occur in a F2F context.

Online discursive communities can provide opportunities for the voiceless to be heard, in ways that elude F2F gatherings. They can attract some marginalized groups (such as remote, aged or hearing-impaired—but *not* indigenous, homeless or illiterate people) that prove difficult to capture when an overview of the whole population is sought. Genuine deliberative, inclusionary processes are dependent on random selection to ensure that a diverse, inclusive group is gathered together (Carson & Martin, 1999). It is possible to replicate that random diversity online, for example, through resident feedback panels (Carson, 2003). Random selection has many advantages over self-selecting discourse communities which tend to attract "the incensed and the articulate." Deliberation works best when disparate voices are heard beyond those ghettos of like-minded people around which we are all prone to coalesce. The more narrow the group, the more deluded it can be about the universality of its views.

*Table 3. National Issues Forum's reflective questions to end a forum*

| | |
|---|---|
| 1. Individual Reflections | |
| | How has your thinking about the issue changed?<br>How has your thinking about other people's views changed?<br>How has your perspective changed as a result of what you heard in this forum? |
| 2. Group Reflections | |
| | What didn't we work through? |
| | Can we identify any shared sense of purpose or direction? |
| | What trade-offs are we, or are we not, willing to make to move in a shared direction? |
| 3. Next-Step Reflections | |
| | What do we still need to talk about? |
| | How can we use what we learned about ourselves in this forum? |
| | Do we want to meet again? |

The deficiencies that arise when audible laughter is absent and body language is missing might well be alleviated when synchronicity becomes more refined online and when web cams become part of this equation. Sight and sound are increasingly being added to online deliberations and this will enhance their effectiveness.

## CONCLUSION

A network of skilled face-to-face moderators helped the author define the characteristics of effective moderation. The attributes of effective face-to-face moderation that were gathered, provide a solid foundation for considering the attributes needed for e-moderation. Many of the same skills can be employed online; others are quite difficult to replicate. Being mindful of these challenges and exploiting the advantages offered by online communication, e-moderators can strengthen discourse communities. Online dialogue provides another means for stimulating public discourse. Citizens want to participate in different ways so it is important for convenors of public conversations to expand the sites. More robust and reflective deliberations can only help to redress the world's expanding democratic deficit.

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## KEY TERMS

**Deliberation:** In a group situation, deliberation is the process of clarifying arguments, weighing options and seeking common ground in order to decide.

**Deliberative Democracy:** Sometimes referred to as discursive democracy, it is democracy which is discussion-based and collaborative. Deliberative democracy stresses the importance of inclusive, public deliberation prior to important political decisions.

**Discourse Communities:** Groups convened for the purpose of discussion or deliberation (the latter denoting a movement toward common ground or decision-making).

**E-Moderation:** The person who facilitates or makes easy the work of an online discussion or decision-making group—sometimes also referred to as the facilitator.

**E-Tivities:** Online activities that lead to active and interactive learning.

**Flaming:** A colloquial expression used to describe the sending of inflammatory messages through e-mail or online.

**Moderator:** The person who facilitates or makes easy the work of a group—sometimes also referred to as the facilitator.

**Public Discourse:** A collective conversation taking place in the public sphere usually to resolve issues of public importance. The term is also used to describe a system of ideas or knowledge used to legitimate the exercise of power.

# Enabling Federated Identity for E-Government



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## INTRODUCTION

Today's administrative and business environment calls for information sharing on an unprecedented scale, from government to business to citizen. Sharing and interoperating among agencies, businesses, and governments around the world create opportunities to simplify processes and unify work, as well as improve the overall performance of government. Secure interoperability, based on identity management solutions, enables substantial cost savings, streamlined processes and faster communication of vital information to the benefit of governments and citizens of all nations.

At the core of this revolution is the concept of federated identity management and the need for standards that are open, interoperable and decentralized. In addition, such standards must allow for privacy safeguard across all sectors. The Liberty Alliance Project (Liberty Alliance, n.d.) was established to address this need and tackle the twin issues of standards and trust.

## BACKGROUND

Today's administrative and business environment has created an unprecedented need to securely share sensitive information among national, regional and local governments, agencies and organizations, as well as with citizens and business entities. The true distributed computing platform created by the Internet brings into sharp relief the importance of adhering to emerging privacy standards and data security regulations.

Identity is at the core of any information-sharing transaction: government to citizen, government to business or government to government. Individuals' identities not only prove that they are who they say they are, it also indicates what they can do and what resources they can access. Governments are often the source of core documents that relate to one's identity: birth certificates, drivers' licenses, employment and tax records, marriage and death certificates, and the like. Identity credentials are perhaps more relevant in today's digital society in their electronic form than on paper.

### Identity Management Issues

Effectively managing one's identity means retaining control over the information relative to who one is, who has access to it and how it is used. While simple in the abstract, the task is enormously complex in reality. Even within a single organization, an individual may rely on multiple identities: an employee may need to authenticate to a database, an application or a service using completely different mechanisms. Once outside the organization, the problem is compounded. Multiple organizations will hold multiple instances of identity and attribute information. The problem of effectively managing all these instances is enormously complex, resulting in ineffective identity management and complexity.

Furthermore, as governments, citizens and businesses extend their services, they are challenged to grant access to resources and applications to the right people at the right time without sacrificing privacy, security or scalability. Since today's communities of interest are built and modified on a dynamically changing basis, trust must be able to be created or eliminated quickly. The old ways of managing identity dramatically reduce the organization's ability to move quickly enough to respond to changing relationships.

### The Ideal Solution

Ideally, government would like to have the ability (whether through technology, business practices, policies, education or a combination thereof) to meet the following seemingly conflicting requirements:

- Simplify access to services and applications both inside and outside the organization
- Reduce the need to maintain and manage multiple sets of identity credentials
- Reduce the cost and complexity of managing identities

- Enable dynamic creation and management of trusted relationships
- Preserve privacy and ensure data security.

## FEDERATED IDENTITY MANAGEMENT

Fortunately, there is a solution that approaches the above ideal: *federated identity management*. Federated identity management makes it possible for an authenticated identity to be recognized and take part in personalized services across multiple domains. Federated identity avoids the pitfalls of centralized storage of personal information while allowing users to link identity information among accounts. Since users can control when and how their accounts and attributes are linked and shared, they retain greater control over their personal information. In practice, this means that users can be authenticated by one organization or Web site and be recognized and receive delivered personalized content and services in other domains without having to re-authenticate.

Increasingly, governments are looking at federated identity as the preferred underlying identity architecture for interacting with their various constituencies and partners. Federated identity provides governments with an open and standards-based approach for enabling access to sensitive internal resources to external parties.

The advantages of federated identity include:

- A standards-based mechanism of both sharing and managing identity information as it moves between discrete legal, policy and organizational domains
- A cost-efficient means of establishing single sign-on to cross-domain resources
- A simpler way to grant and revoke user access to information
- A reduction in the number of sign-ons and passwords an individual must work with to access multiple systems and databases
- Greater security when it comes to user access to information.

## PUBLIC SECTOR BENEFITS

Within a single government organization, a federated identity management infrastructure can bring substantial cost savings, operational efficiencies and increased security. These benefits come in the form of more effective employee provisioning and password management, focused development efforts on a single standard that will be supported by a variety of technology providers, and the ability to more easily outsource certain employee applications in a secure and flexible manner. Also, since employee identities can be managed internally and brought online and off-line quickly, deployment of a federated identity infrastructure limits an organization's vulnerability to security attacks by current or former employees and contractors.

The real benefits of federated identity management can be seen when communication takes place between and among various organizations. Below, we briefly discuss several situations that call for federated identity.

### Government to Government

Many types of vital information must be shared across government and organizational boundaries. Interoperability is a requirement within agencies, among organizations and even between nations. Indeed, the dynamically changing nature of national coalitions calls for dynamic circles of trust (a group of organizations that have established trusted relationships with one another and have pertinent agreements in place regarding federations). A federated architecture now allows systems to interoperate while maintaining their autonomy. The circle of trust provides participating organizations the framework to ensure that this interoperability is trusted and secure.

The compelling need for sharing sensitive information, and thus for federated identity management, can be clearly seen in times of disaster. A regional incident, such as an earthquake or avalanche, brings together myriad organizations that must freely share disasterresponse information among all relevant agencies and governments, often spanning multiple countries. When information about victims, rescue and response actions, and law enforcement activities are at stake, it is vitally important to ensure that individuals are properly authenticated prior to exchanging such sensitive information.

Government information sharing is a requirement not only in times of crisis; in fact, it permeates all aspects of government. For example, the European Commission's eEurope (eEurope, n.d.) activity covers a number of initiatives, including e-government, e-health, e-learning, and e-business, all designed to foster the development of new and better services. Examples include initiatives related to the health sector in Spain and Finland, the management of relations between administrations and companies in Belgium, the indexing of public files in Italy, e-voting in some local consultations in France, and much more. In each, the need for interchange of information requires a federated identity management framework to enable free flow of information while preserving security and privacy.

## Government to Citizen

Perhaps in no other area of communication is the need for secure yet open access as important as in government-to-citizen interaction. Governments around the world are embarking on e-government and e-authentication initiatives, widespread broadband access and electronic communication programs to bring the benefits of technology to their citizens. In the public sector, various government departments and agencies give citizens and businesses access to online services through their e-authentication initiatives. The federated approach is ideal to avoid any generalized interconnection of public files containing personal information, because it ensures that data is not duplicated in a single central database.

Individual government authorities can act as identity providers for citizens by establishing circles of trust and offering a complete range of personalized applications across different government agencies and domains, such as online tax declaration, reimbursement for medical expenses, car registration, and electronic passport and driver's license renewals. In addition, with strong yet manageable authentication, governments can ensure that benefits are going to the authorized recipients. Such a scheme can quickly lead to single-sign-on, with the resultant benefits of cost reduction and increased security.

The eEurope 2005 Action Plan (eEurope, n.d.) embodies these initiatives, aimed at modernizing public services and giving everyone the opportunity to participate in the global information society. One area of particular focus is health care. Over the past few years, much progress has been made in building integrated regional health information networks, standardized electronic health records and the like. New initiatives will enable rapid reaction to health threats while protecting individuals' health information from unauthorized access.

## Government to Business

Whether for government sales of assets, expanded tax products for business, one-stop business compliance, streamlining of international trade or other activities, businesses have come to expect more electronic interaction with government. This is especially true for small- and medium-size enterprises: With limited resources for interacting with government agencies, they are eager to find convenient procedures for such activities as VAT declarations or company registrations. A federated architecture is essential, as it enables a single-sign-on capability and seamless and secure interaction with distinct functions or agencies, while leaving each user in control of his or her data.

When business interacts with the government, the conflicting requirements of privacy and interoperability must both be addressed in a delicate balance. An interesting example can be seen today in Japan's EduMart, part of the e-Japan Policy Priority Program (e-Japan, n.d.) and spearheaded by the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters, n.d.). In an effort to bring rich educational content to students at more than 40,000 schools, the IT Strategic Headquarters established an open interface and built an educational content distribution network that will lead to a system in which both public institutions and private businesses can connect to interfaces and freely participate.

Additional examples can be seen across the value chain, from government-controlled health care programs that must communicate with providers and patients, to government contracts with foreign suppliers, to basic business licensing and taxation. Speed, timeliness, accuracy and user friendliness are the obvious outcomes of such initiatives.

To generalize across these public sector scenarios, the benefits of implementing a federated identity strategy and infrastructure fall into five main categories:

- Improved alliances, both within governments and between governments, through interoperability with autonomy
- Faster response time for critical communications
- Cost avoidance, cost reduction and increased operational efficiencies
- Stronger security and risk management
- Interoperability and decreased deployment time.

# FEDERATED IDENTITY IN ACTION

## GSA E-Authentication

The United States (U.S.) General Services Administration E-Authentication Initiative (e-Authentication, n.d.) is aimed at providing the necessary federated identity infrastructure to support a common, unified authentication process and streamline access to government online resources. Based on federated identity, E-Authentication will help government departments and agencies accelerate delivery of online services by allowing them to leverage a variety of electronic credential providers.

## County Land Document Recordation Exchange

An example of cooperation between government and citizen can be seen in the U.S. initiative called the Internet-Based County Land Document Recording Exchange (Elec-

tronic Recordation Exchange, n.d.). Intended to dramatically streamline the land recordation process for participants, notably mortgage and title companies, it will save time and money while increasing the integrity of the participating local government land records systems. Users swipe smart cards through readers to access the system. The cards contain digital certificates that identify the users and can be passed along within the CoT. As other lending companies and counties join the County Land Document Recordation Exchange, they become part of the identity network and validate their own users as partners within the circle of trust. This minimizes the spiraling number of log-on credentials needed by users as they exchange documents with an ever-growing number of partners. It is only recently that such a fully electronic process became legally possible. The U.S. E-Sign (Electronic Signatures in Global and National Commerce Act, n.d.) went into effect October, 2000. The act allows suitable electronic signatures to have the same legal effect as written signatures.

### Guide Project

GUIDE (Guide, n.d.) is a European Union (EU)-funded research project conducting research and technological development, with the aim of creating a technological, institutional, policy and socio-economic architecture for secure and interoperable e-government electronic identity services and transactions for Europe. Increasingly, citizens of the EU work, travel and access social security or health care services in other Member States. The primary practical objective of GUIDE is to create an architecture to solve the current cross-border compatibility issues.

### Joint Warrior Interoperability Demonstration

The Joint Warrior Interoperability Demonstration 2003 (JWID) (Joint Warrior Interoperability Demonstration, 2003) demonstrated government-to-government interoperability. Spearheaded by the US joint chiefs of staff, JWID tackles identity issues across national and international boundaries. One key objective is to enable a standard solution for information sharing among coalition partners. Important issues are authentication and identity management, since each nation retains control of its own information, and desires to maintain its autonomy without impeding the free exchange of information.

In JWID 2003, military forces from six nations (Canada, Australia, New Zealand, U.S., United Kingdom, and Norway as the NATO representative) used federated identity solutions to clearly demonstrate how federated identity management could save lives, increase communication and build stronger alliances. Using its federated authentication architecture, the solution tied together message traffic from land-based and maritime units from all six countries, showing the true potential and value of this approach in scenarios that required the ability to revoke credentials from field forces that may have been compromised.

## STANDARDS

Federated identity will not become ubiquitous without broadly supported standards to act as the necessary building blocks. Some key standards and proposals are discussed in the following sections.

### SAML

The most successful federated identity building block to date is the Security Assertions Markup Language (SAML) (SAML, n.d.), an Extensible Markup Language (XML) framework for exchanging security information between servers.

SAML 1.0 became an OASIS standard in November 2002; SAML 1.1 followed in September 2003. SAML has seen significant success within industry—seeing successful deployments in financial services, higher education, government and other verticals. SAML has been broadly implemented by all major Web-access management vendors. SAML is also supported in major application server products, and SAML support is common among Web services management and security vendors.

SAML 2.0 reflects a three-fold convergence between SAML 1.1, Liberty ID-FF 1.2 (ID-FF 1.2, 2003) and Shibboleth (Shibboleth, n.d.) and, as such, is a critical development for federated standards.

### Identity-Federation Framework

In 2003 the Liberty Alliance took SAML 1.0 and added mechanisms for account linking and session management to define its Identity Federation Framework. The extensions that Liberty defined to SAML 1.0 (and later SAML 1.1) were contributed back into SAML 2.0.

Although ID-FF is deprecated in favor of SAML 2.0 going forward, the Liberty Alliance continues to build on SAML—its Identity Web Services Framework (ID-WSF 1.1, 2005) has been adapted to include support for using SAML 2.0 assertions to communicate identity among Web services actors.

## WS-Federation

A separate effort for federated identity protocols is WS-Federation (WS-Federation, 2003)—part of IBM and Microsoft's WS-* initiative for a broad set of composable standards for Web service security. Although WS-Federation has not itself been submitted to an open standards body, WS-Trust, on which WS-Federation builds, is now being developed within OASIS' WS-Secure Exchange Technical Committee. Microsoft's Infocard is a client component of the next release of Windows that may give end-users greater control over their identity by integrating through WS-Trust with identity requestors and providers.

## FUTURE TRENDS

Multiple drivers and trends are pushing governments towards federated identity: greater degrees of collaboration with internal and external partners, heterogeneous security infrastrctures, regulations governing the acquisition and treatment of privacy and sensitive information all enourage government departments to implement a federated model of identity management for their constituent employees, citizens and partners. We expect that this push will continue—the future will show an increased number of deployments of federated systems, with more prototypes emerging and early prototypes evolving into full-scale deployments.

Deployments of strong authentication and federated identity are expected to go hand in hand, federated single sign-on allowing the cost of strong authentication to be borne by dedicated providers, but the value of increased security it enables shared elsewhere thereby makes strong authentication affordable and scaleable.

We also expect to see continued convergence between the various proposals and standards for the identity protocols and identifiers. The so-called identity metasystem is an encouraging development towards this end.

## CONCLUSION

Sharing and interoperating among agencies, businesses and governments around the world create challenges for authentication and authorization to control aceess to distributed resources. Federated identity management, by allowing home organizations to authenticate their end users for their transactions across security domains, likely represents the best approach to addressing these challenges in a scaleable and flexible manner. To be practical, federated identity requires two key components: trust and standards. The Liberty Alliance, a global consortium of more than 150 leading global organizations, including numerous government and non-profit agencies, is leading the way in both developing the standards to enable the flow of identity information in a privacy-respecting manner, as well as defining best practices and guidelines to faciliate the establishment of trust between organizations.

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## KEY TERMS

**Circle of Trust:** A group of organizations that have established trusted relationships with one another and have pertinent agreements in place regarding how to do business and interact with each other and manage user identities across their boundaries.

**Identity:** The set of behavioral or personal characteristics by which an individual is recognizable.

**Identity Management:** The set of processes by which individuals can be granted access to appropriate network resources, but no others.

**Federated Identity:** The agreements, standards and technologies that make identity and entitlements portable across autonomous policy domains.

**Privacy:** The right of individuals to control the collection and subsequent use of their identity information.

**Single Sign-On:** The sequence by which an individual can authenticate to one Web site and then be able to access protected resources at another site without additional authentication.

**Web Services:** A set of standards for distributed computing on the Internet.

# E–Participation and Canadian Parliamentarians



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## INTRODUCTION

During the last decade, the public policies of many countries have emphasized the need for greater citizen participation in decision-making, and governments have been adopting e-government strategies as a means of not only improving service delivery, but also engaging society and revitalizing democracy. Indeed, many political leaders have been advancing the democratic potential of information and communication technologies (ICTs). British Prime Minister Tony Blair, for example, has stated: "I believe that the information society can revitalize our democracy...innovative electronic media is pioneering new ways of involving people of all ages and backgrounds in citizenship through new Internet and digital technology ... that can only strengthen democracy" (Hansard Society, 2004). Similarly, former United States President Bill Clinton stated that ICTs would "give the American people the Information Age that they deserve—to cut red tape, improve the responsiveness of government toward citizens, and expand opportunities for democratic participation" (Prins, 2001, p. 79). In Canada, former Prime Minister Paul Martin also argued, along the same vein, that people need to be brought into the decision-making process if the country is to have the kind of future that it needs, indicating that ICTs are a useful means of achieving this goal (Speech to the 2003 Crossing Boundaries Conference, Ottawa Canada).

## BACKGROUND

At the same time as governments have been praising the idea that ICTs can serve as the necessary tool for allowing the public a greater voice in governing, and for strengthening democracy, there has been a proliferation in the literature making similar arguments. Broadly speaking, this school of thought can be referred to as Utopian. For those adhering to this approach, ICTs provide "solutions to problems of space, population, access, and participation" (Saco, 2002, p. xvi). Some go as far as stating that ICTs will empower citizens to the point where existing structures of representative government are rendered obsolete (Naisbitt, 1982). Others take a more moderate approach, pointing to the way that society can use ICTs to mobilize and to increase the efficiency and effectiveness of various campaigns. This use of technology has been fittingly termed "cyber-activism" by some scholars (Dyer-Witheford, 1999). Others take a different approach, still arguing that the technology constitutes a means for governments to re-engage those who have been disengaged from public affairs (Coleman, 2001). In this sense, ICTs are seen as allowing for the possibility of a new public space–a sort of electronic agora–where citizens serve as an active participant in governing (Centre for Collaborative Government, 2002).

Contrary to the Utopians, is the approach offered by the Dystopians. This group does not agree that ICTs will fulfill the democratizing role outlined by the Utopians. Rather, they argue the technology has no impact on citizen engagement and it is "politics as usual" (Margolis & Resnick, 2000). Some go further arguing that ICTs are having a negative impact on participation and democracy as a result of its speed and inequities related to access (Barber, 2001; Taylor & Saarinen, 1996).

## E-PARTICIPATION OR POLITICS AS USUAL?

The literature on this subject summarizes the various uses of ICTs and their positive and negative ramifications; however, it tends to make two vital omissions. First, much of the literature especially that which takes a "cyber-activist" approach, focuses on the use of ICTs by society. In terms of participation, it details the use of ICTs as a tool for citizens to participate in governing, but most often neglects to examine how government representatives respond to the electronic efforts of society (for an exception see Moynihan, 2003). Second, much of the literature makes assertions concerning the impact of ICTs on participation and democracy without clearly defining democracy, or what increased participation would require (Barber, 2001). Drawing on theories of participatory democracy, the Utopian-Dystopian dichotomy found in the literature, and looking at the situation in Canadian federal politics, this chapter attempts to begin addressing these gaps and to offer further insight into the impact of ICTs on citizen participation and democracy. Canada serves as an interesting case to consider as less is known about how

its parliamentarians are using ICTs to engage its citizens (Coleman, 2001, for example, has looked extensively at the British situation and authors such as Margolis & Resnick, 2000 have explored the American situation). This study also has the potential to provide for future comparative analysis and it identifies many barriers to e-participation to be considered.

An exploration of the literature on participatory democracy and models of e-democracy allows one to tease out four criteria that should be fulfilled before one can say that ICTs are enhancing participation and democracy (Chadwick & May, 2003; Fishkin, 1991, 1995; Laudon, 1977; Pateman, 1970). This is useful as it provides a context for thinking about and evaluating e-participation. The four criteria are:

1. Information/education
2. Avenue for participation/consultation
3. Deliberation
4. Evidence that views are heard

Each criterion will be discussed briefly, in turn, along with the results of an empirical examination of the Canadian situation. The empirical study is modeled on work done by Andrew Chadwick and Christopher May and a dataset complied by the Cyberspace Policy Research Group (CyPRG). It employs a multi-disciplinary approach and studies the content of the Web sites of Canadian Members of Parliament (MPs). At the time this study was conducted 200 of the 299 sitting MPs had Web sites. It also draws on interviews that were conducted with sixty Members of Canada's 37th Parliament concerning their use of ICTs, how they respond to Canadians who seek to participate in governance electronically, and some of the barriers they felt were preventing them from fully engaging in e-participation.

## Information/Education

Democratic theorists place a great deal of importance on information and education. Access to good and up-to-date information is useful not only for helping people come to informed decisions during election periods, but it is also necessary to help them participate, on an ongoing basis, in matters of governance. Indeed, the lack of information and knowledge about policy issues is often cited as a reason for rejecting greater participation: "Perhaps the most commonly advanced reason for rejecting direct democracy via the Internet...is that citizens are poorly informed about public issues much of the time...what sense does it make to ask citizens what government policy should be on a matter about which the majority of the people know either little or nothing" (Brooks, 2000, p. 12). The type and sources of information are also important to consider. An environment which fosters participation and the third condition outlined here—deliberation—requires that diverse opinions and a variety of information be made readily available to the public. While the Internet does offer a great deal of information from a variety of sources (not all credible), it can be difficult to navigate and to evaluate. If government officials truly wanted to harness the democratic potential of ICTs then one can speculate that government and individual MPs' Web sites, should contain information which would help citizens become aware of various issues and processes of government.

A survey of Canadian MPs' Web sites indicated that this condition is being fulfilled fairly well. In total, 160 of the MPs offered information and links to federal government services and programs. Conversely, only 119 of the MPs offered information or links to sources beyond the federal government. Surprisingly, only seven MPs offered information regarding the issues and legislation being considered by Parliament; however, most did provide hyper-links to the main Canadian Parliamentary Web site where such information could be found. Many of the MPs interviewed for this study stated that they felt as though they were expected to have an online presence. Most answered that they thought it important to have Web sites so that they could effectively and efficiently share information with their constituents. However, there seemed to be uncertainty over what type of information Canadians would like to find on their MPs' Web sites. As one MP stated, there is a "veil of ignorance" among MPs as to what type of information citizens would find useful or would like to have access to. This MP's admission of such ignorance was interesting as it indicates that perhaps elected representatives put little thought into what Canadians may need information about and, what type of information is required to present to them so that they can make informed decisions when participating in either elections or policy discussions. They are not paying attention to the education and socialization of the public, which as Pateman argued is necessary for participation to flourish.

## Avenue for Participation/Consultation

Having information is not a sufficient condition for greater democratic participation. For this to occur, it is obvious that there must be avenues by which citizens can be engaged or consulted. While traditional democratic processes do have some built-in participatory mechanisms, such as committees, or inquiries, these are not always open to all citizens and it is often difficult for individuals to participate. Moreover, it is important to recognize that there are limitations inherent in the traditional methods of engagement. These can include such things as time and money. For many who adhere to a more Utopian approach,

ICTs provide a means of overcoming such limitations. Therefore, one can assume that if ICTs are improving participation, government Web sites should offer various mechanisms for interaction.

In Canada, such mechanisms for interaction were found to be somewhat limited. Each of the MPs' Web sites was surveyed to see whether they offered citizens avenues for communicating with the representative. This included looking for direct links to electronic mail, more traditional contact information, and online forms that people could fill-out if they wanted to provide input on any number of issues. Almost all of the MPs with Web sites, or 193, provided direct links to their e-mail accounts on the Internet. Recognizing that not all people may want to contact their representative electronically, the same number offers non-electronic contact information. In total, 84 MPs offered an online feedback or comment form. Seven MPs offered online polls where they actively solicited input on pre-established questions and issues.

Most of the MPs interviewed thought contact information to be among the most essential type of information to provide. They felt that the Internet provided an alternate avenue for participation and served as a good communication tool. As such, they wanted to ensure that Canadians had the contact information necessary to take advantage of this tool. Indeed, 22 of the 60 MPs interviewed stated that they were motivated to establish Web sites for the purpose of providing their constituents with an alternate means of participation. Some indicated that they felt their constituents expected electronic avenues of participation to be available to them. Of the 60 MPs interviewed, 45, or 75%, indicated that ICTs do allow for greater citizen participation and have increased their communication with constituents. As one MP stated, the technology has improved communication with Canadians to "a scale that I never could have appreciated." Another responded: "Oh it has increased without a doubt ... I think that it gives them (Canadians) more of a voice." It is interesting to note, however, that of those 45 who stated that ICTs have increased their communication with constituents, three were careful to specify that while correspondence had increased, the communication was not meaningful. Others felt that it had improved their communication with their staff and their ability to conduct research, more than it had with Canadians in general.

## Deliberation

Some scholars assert that it would be necessary for participating citizens to also deliberate before any decisions are made (Coleman & Gøtze, 2001; Fishkin, 1991). This, argues James Fishkin, is what makes decisions and participation meaningful. Participants must be "willing to consider the arguments offered on their merits. They must listen and participate with an openness to the reasons given on one side or another" (Fishkin, 1991, p. 37). Given this, one can speculate that if ICTs are strengthening democratic participation then one should be able to clearly identify electronic spaces where deliberation can occur. This condition was found to be far from fulfilled in the Canadian context when looking at MPs' Web sites.

In looking for the presence of deliberatory spaces, each MP's Web site was scanned for such things as electronic bulletin boards, chat servers, and discussion lists. In total only two Canadian MPs offered such features on their Web sites, and one was found to have removed this feature from his site shortly after this study was conducted. His office noted that the feature was not being used and they were trying to rework it to attract more people. Interestingly, only four of the 60 MPs interviewed indicated that they felt ICTs could improve interactivity or deliberation with citizens. However, even these four were skeptical about the potential for deliberation arguing that they lacked the resources necessary to use ICTs for this purpose. Some felt that citizens would not be able to use deliberatory fora in a manner that would be useful, arguing that the speed of ICTs allows for reactionary response that is not well thought out, or well informed.

## Evidence that Views are Heard

This fourth criterion is vital for any participatory tool, and is essential to e-participation. If people do not feel that their views or input are being heard, there is little motivation to continue to participate. In this case, people will continue to feel dis-engaged. As was noted earlier, this is where much of the existing literature falls short. It is relatively easy to discern whether the avenues for participation exist; however, what happens to the information relayed by citizens to their representatives is truly another matter. Therefore, it can be assumed that if ICTs are in fact improving participation then government officials should have means and procedures for handling electronic correspondence and dealing with those citizens who seek to become engaged electronically. To examine this fourth criterion, this study focused primarily on the interviews conducted with MPs. The results gathered were somewhat surprising. While most MPs indicated that they made efforts to respond to those people who e-mail them looking for help on issues related to accessing federal services, almost all of those interviewed stated that they simply deleted campaign mail where constituents and social movements have attempted to convey their input on policy and matters of governance. One MP laughingly stated that campaign mail such as that described above is "filed under 'G,'" while pointing to the garbage and recycling bins beside his

desk. While such comments were made in a rather lighthearted manner, they pose some serious implications for the arguments made by those adhering to a more Utopian approach.

Again, lack of resources was cited as the reason for not further embracing the technology and peoples' efforts to participate electronically. Indeed, with only a couple of exceptions all MPs expressed frustration at what they felt is increased pressure as a result of e-mail. The volume of electronic correspondence has been mounting over the years and MPs feel as though there are growing expectations for timely replies on behalf of those initiating the correspondence. The representatives spoke of a paradoxical situation that they found themselves in where they know that ICTs can be used to engage people in governance, but fear that they will discredit themselves in the eyes of voters as they lack the resources to handle such increased engagement. As such, many MPs stated that they made a conscious effort to minimize their online presence, and did not actively promote e-participation.

## FUTURE TRENDS

This study points to a disconnect between the rhetoric of political officials and the current reality when it comes to increasing citizen participation. It provides a foundation for comparative studies with other democracies and it has also yielded a number of issues that merit future study. For example, as was seen, MPs in Canada indicated that lack of resources was the primary barrier for e-participation. However, most indicated that they would not want to spend increased funding on correspondence or citizen engagement. This prompts one to question whether lack of resources form the crux of the problem or whether it is something more deeply imbedded in the political culture of parliamentarians.

Interaction beyond MPs, possibly with the bureaucracy would also lend further insight into the issue of e-participation. There is a limited amount of work done on this subject. Is the bureaucracy taking a more proactive role and communicating directly with citizens regarding policy formation and change? A study on this subject would be interesting and the results gathered could potentially bring the role of elected officials, and representative democracy, into question.

In addition, this work raises concern about the traditional role of social movements. As was noted above, elected representatives in Canada are particularly frustrated by the large numbers of campaign mail that they receive from such movements. Are social groups impeding the potential for enhanced individual participation by overwhelming policy makers with e-mail? The open admission from Canadian MPs that such mail is deleted also calls into question the efficiency of the activities of such movements. At first light, these questions seem to indicate that perhaps the role of social movements needs to be reconsidered in an era of ICTs where individuals are able to have a stronger voice than they once were.

## CONCLUSION

When examining the statements of senior politicians, both within and outside of Canada, we are presented with a policy context that appears to be conducive to an enhanced participatory democracy propelled by the use of ICTs. However, a more in-depth exploration of the requirements for participatory democracy, an analysis of the content found on MPs Web sites in Canada, and a look at how MPs handle electronic correspondence starts to show a different scenario. This study has shown that e-participation, particularly in the Canadian context, can still be quite limited. Rather than serving as a tool for participatory democracy, ICTs appear to be enhancing and strengthening the existing system of representative democracy where MPs do not enter into deliberations with citizens, but serve as champions for their constituents. The fact that the MPs interviewed for this study tended to focus on e-mail where constituents were looking for help accessing a federal program or service is a testament to this as was the type of information found on MPs' Web sites; namely, links to government programs and services.

However, this is not to say that it is "politics as usual." ICTs have definitely had an impact on the day-to-day activities of MPs. As was discussed, many noted that the technology had improved their communication with their staff and their ability to do research so that they could better participate in Parliamentary activities. Moreover, while ICTs may not have dramatically improved citizen's ability to participate in governance, they have led to an increase in the amount of correspondence received by MPs' offices. In closing, it can be argued that the current situation would be better classified as paradoxical as governments learn and struggle with many of the complications that have come from the widespread use of ICTs.

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## KEY TERMS

**Chat Servers:** Chat servers are programs that allow for a high level of "real time" interaction between users. Here, software is employed that enables one user, or group of users, to view a message as another is typing it. Effectively, one might think of this technology as an electronic telephone conversation. This type of technology is particularly useful for e-participation when thinking about avenues for deliberation.

**Cyber-Activism:** Cyber-activism refers to the use of information and communication technologies by individuals or groups to organize and to lobby governments.

**Discussion Lists:** Discussion lists enable users to join mailing lists on a specified topic. Those who join the list can send and receive messages from all of the others on the list. Typically, members share information relating to the subject of the mailing list. This form of interaction is not done in real time and is closer in nature to the bulletin board format than the chat server. However, discussion lists can still serve as a useful mechanism for e-participation.

**Dystopians:** This is a broad means of classifying the various arguments found in the literature on e-participation and e-democracy. Those adhering to a Dystopian approach are those who would argue that ICTs have not improved participation or democracy and in some cases go further by arguing that the technology is having serious negative effects.

**E-Democracy:** Sometimes defined as a component of e-government, e-democracy refers to the way that ICTs are being used to enhance democracy by improving such things as citizen participation, accountability, and transparency.

**E-Government:** The use of ICTs by governments for such things as improved service delivery and information sharing.

**E-Participation:** The use of ICTs by citizens to interact with policy-makers in an effort to take a more active role in governance during non-election periods.

**Electronic Bulletin Boards:** Electronic bulletin boards are programs which enable users to leave messages and to access messages and information on any array of topics. This has the potential to facilitate deliberation and can serve as a useful tool for e-participation.

**Utopians:** This is a broad means of classifying the various arguments found in the literature on e-participation and e-democracy. Those adhering to a Utopian approach are those who would argue that ICTs are dramatically strengthening democracy and the potential for citizen participation.

# E-Planning



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## INTRODUCTION

E-planning is the e-government concept applied to urban and regional planning. It is the widespread use of information and communication technologies (ICTs), especially the Internet, in the planning system. A planning portal is the access point in the Internet, frequently in the context of a public digital city project. E-planning allows the municipality to carry out a new set of activities or to implement traditional procedures in a new form, due to geographical information systems, computer aided design and database systems, among other tools mentioned, for example, in Mohamed, Meng, and Abdullah (2003), Budthimedhee, Li, and George (2002), Campagna and Deplano (2004), and Harrison and Haklay (2002). E-planning corresponds, therefore, to the passage from a paper-based urban management system to one based primarily on electronic means of information and communication. But it must be seen as more than a simple transfer to a computer system of the traditional paper based routines (Mohamed et al., 2003; Parsol, 2004), requiring also the re-engineering of procedures, the development of a fully integrated ICT back office and, as Harrison et al. (2002) suggest, changes in the nature of the planning process itself. The aims of e-planning, such as more generally all the other components of e-government (for example, OECD, 2003; Pascual, 2003), are to provide better public services, more efficiently, with lower costs and, at the same time, to do that through more participative, transparent and more accountable decision-making processes.

In its more basic level, the e-planning system only offers information and is, therefore, easier to implement. In its more advanced versions, where all or most of the planning services are delivered electronically, its implementation and daily management is not only a more complex task but it also involves more investment, as Couclelis (2004) notes for digital cities. According to the standards of e-Europe, the European Union (EU) initiative for the information society (CEC, 2000, 2002), the availability of public services online can be measured in relation to a framework of four levels of e-government maturity (CEC, 2004).

Applying this scheme to the planning sector, we can consider that the first level—information—consists only in the publication of digital information through the Internet, with few or no capacities to interact. In the second level of maturity—interaction—users of the system can communicate directly with the planning department by electronic mail (one-way interaction); it is possible to download planning applications, for example. In the third level—transaction—users and the planning department communicate electronically with each other (two-way interaction); it is possible to process planning applications and to authenticate them. In the fourth level—integration—there is a full electronic handling of all planning functions.

## BACKGROUND

### Main Characteristics of E-Planning

According to the previous framework, applied to this specific policy area, and taking into consideration the content of several planning sites in Europe, a standard full-developed e-planning portal is expected to provide general information about the functioning of the planning system, municipal regulations, and planning procedures and to include basic and specialised information on all aspects of the planning system, in its several scales—national, regional, and local—as well as, in the case of European countries, a supranational level. It is also expected to provide access to online planning services covering all stages of the development and control process: pre-application advice, submission of applications, consultation, e-petitions, commentaries, complaints, and planning decisions (for the UK example, see Parsol, 2004).

Other planning functions are also present such as the publication of local plans, technical reports, public participation files, monitoring and evaluation reports, and urban marketing campaigns. Urban plans are available in electronic format, allowing any citizen to visualise land use proposals through a public participation geographical information system (PPGIS) and to get a better understanding of all its potential consequences (Carver, Evans, Kingston, & Turton, 2001; Harrison et al., 2002). Detailed information on each parcel of land or building can also be available online, with restricted access conditions in what respects information on private persons (e.g., e-signa-

tures), allowing any local citizen to verify the situation of a process in which he or she has a stake. It must also be possible to make payment of services, fees, or taxes through the planning portal.

A planning blog, a digital newsletter, and mailing lists to distribute automatic e-mail updates about the Portal content are examples of e-planning tools that can be used to stimulate citizen involvement in decision making. But, as Carver et al. (2001) point out, it is not enough to make information available and to stimulate participation, it is necessary to provide information that can be understood by the local community, technology that a common citizen can use and to open the internal decision-making process (Harrison et al., 2002) applying, in practice, the Aarhus Convention on access to information and public participation in decision making (UN, 1998).

A section for children and youths, with information and games for different ages, organised around planning themes, should be included as a form to stimulate participation of young people in municipal and regional life (CoE, 2003) and, through that, to contribute in practice to the implementation of the UN declaration on the rights of the child, especially the right to express views freely in all matters affecting them (UN, 1989).

In an increasingly multicultural society a planning portal is also expected to have an English version and also versions in the main non-native languages present in the local community, if that is the only way to communicate with large sections of the immigrant population, as part of the moral obligation due to cultural diversity (UNESCO, 2001).

It can include an agenda of events related to planning such as, for example, public inquires or municipal boards meetings dealing with planning issues, and a process to measure citizen satisfaction with e-planning services, among other items. If not integrated or linked to a wider municipal Web site, the planning portal should also include general information about the municipality (e.g., geography, history, economy, culture), as well as about the municipal organisation (e.g., organisational chart, elected members, contacts, activities, including e-procurement related to urban management).

## Strengths and Constraints

In relation to the traditional paper based planning system, e-planning presents several advantages, such as those mentioned in Mohamed et al. (2003) or in Yeh and Webster (2004), among other authors, and in several governmental reports, such as DoE (2003) and SE (2001), which are similar to those mentioned for e-government in general (OECD, 2003; Pascual, 2003): more accessible, efficient, effective, quicker, and with lower costs.

It is more comfortable for citizens because it reduces the number of direct contacts needed and time spent, as well as the administrative costs that affect small- and medium-sized enterprises. Planning information can be available permanently for planners and other staff, as well as for the public, in almost every place, if wireless communications are used. It makes easier to work from home, both for planners and for other people that need planning information. It needs less physical space for storage and tends to require less as technology improves.

E-planning has the potential to open up a new Era in public participation in planning, especially through the use of PPGIS (Carver et al., 2001; Harrison et al., 2002) and through the visioning of any area in three dimensions. It can make decision-making more transparent and accountable by allowing the development of a more informed opinion about urban or regional plans proposals, which can contribute to prevent NIMBY (not in my backyard) type of reactions during plan implementation, therefore increasing citizens' confidence in the planning system.

E-planning also faces several types of constraints (Campagna et al., 2004; Carver et al., 2001; Couclelis, 2004; Harrison et al., 2002; Mohamed et al., 2003, among others), not different from those usually referred for e-government in general, such as legislative and budgetary barriers, technology requirements and digital divide issues (OECD, 2003; Pascual, 2003), or the lack of staff's specific training in e-planning, which together can explain partially the difference encountered among municipalities or regions (Campagna et al., 2004), or among countries (CEC, 2004; West, 2003, 2004).

Examples of legal barriers are, for example, the copyright of cartographic bases (Carver et al., 2001), or the classified nature of public information (Mohamed et al., 2003), or the fact that the law requires, in several circumstances, that a communication needs to be done in paper form and by post, which limits the possibilities to use electronic communications (SE, 2003).

The migration from a paper-based system may face in some cases resistance from staff and local councillors, similar to those mentioned in Mohamed et al. (2003): departmental unwillingness to share information; implementation of e-planning solutions separately in each department, to address specific tasks, proving later to be difficult to link; to maintain information outdated in the planning portal.

## FUTURE TRENDS

Future development of e-planning faces external challenges associated with the overall development of ICT sector and the expansion of the information society (e.g.,

interoperability of ICT, market penetration of specific ICT, broadband universal access, digital literacy), and internal challenges that are related with the functioning of the e-planning system itself.

The growth of ICT use among individuals and enterprises, including the use of online public services (CEC, 2004; West, 2003, 2004), in spite of its social and geographical unevenness (Graham, 2002; Grimes, 2003; Winden, Van, & Woets, 2004), is making information society a reality in most of the developed countries, which will certainly increase the number of users of e-planning systems.

The generalised use of broadband or high-speed connectivity, allowing the use of more sophisticated online services, and the development of multi-platform access to the Internet, are also expected to stimulate the use of Internet and, therefore, of e-planning systems.

At the political level, the European Union, with the e-Europe Initiative, gave the political impulse for the development of the information society in the European context, in particular with its second action plan, which elected as one of its objectives to deliver online public services (CEC, 2000, 2002).

Nevertheless, the type of empirical evidence quoted by Winden et al. (2004) about the low rate of broadband adoption, especially in remote areas, and the exclusion of lower social classes, or the evidence mentioned in Graham (2002) about geographical unevenness inside the city or among regions or countries, suggests that the argument in favour of more (local) government intervention to promote universal broadband access, as part of public infrastructure policy, because the market seems to be failing to do that, deserves serious consideration, a conclusion that Grimes (2003) seems to corroborate in the sense that he identifies similar digital barriers for the development of e-commerce activities in peripheral rural areas.

At the same time it is reasonable to admit that the resistance encountered presently in the use of ICT due to the weak digital literacy (Carver et al., 2001) will probably diminish or disappear as analogical forms of communications are gradually replaced by digital technologies. It is expected that in the next decade the majority of households in developed countries will have interactive digital TV, according to broadcasters' plans mentioned by Carver (2001), with one or more e-Gov-TV channels, which certainly will include the planning portal, increasing the number of potential users of the e-planning system.

Also critical for the future expansion of e-planning are internal factors, such as confidence in the system. Data protection and security in the transactions between the user and the e-planning system and the risk of loss of privacy (Couclelis, 2004) are critical aspects that (local) governments will have to face carefully, in similar terms as those of the more general discussion about human rights in an information age (Walters, 2002), as well as planning professional organisations whose codes of professional ethics do not cover, in general, the specific issues raised by e-planning (Silva, 2005). Without security and confidence on the system there will be probably no massive involvement of the local community. The problem of digital archives for future use, in a century time or more, is another challenge that e-planning, as e-government in general, also has to address, as well as the selection of the place to store them.

## CONCLUSION

For all these reasons, we should only talk about the existence of a comprehensive e-planning system when the fourth stage of development or maturity is reached in its full potential, which means when both the plan and the planning and management processes are mostly carried out on a digital platform. In practice, however, the name has been used to describe a great variety of situations.

Although the new ICT can allow the development of sophisticated public decision-making systems, numerous planners and local councillors seem to be still unwilling to adopt it in the local planning system, a pattern of behaviour similar to what Campagna et al. (2004) found in their case-study. Therefore, e-planning will probably tend to complement the traditional procedures rather than to substitute them entirely in the short and medium term.

Among all key challenges faced by e-planning, it is important to stress the one related with the access of the most disadvantaged social groups and disabled persons, as well as the problems associated with broadband access in the most remote areas. If large segments of the population can't access online planning services or if they cannot understand the information, e-planning will certainly contribute to increase social exclusion and geographical unevenness. To prevent that to happen requires a consistent e-inclusion strategy in order to ensure digital literacy for all citizens, broadband accessibility for all, gender equity, and to make the use of ICT economically affordable.

E-planning can create new social exclusions, in some cases coincident with old social, economic and geographical divides, as did all technologies in the past (Yeh et al., 2004), but it can also be used as an instrument of a broad (local) public policy strategy to promote citizen empowerment and to enhance social cohesion, economic competitiveness and environmental sustainability.

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## KEY TERMS

**Digital City or Digital Region:** A Web site whose content is related to a specific territory, a city (municipality) or a region.

**Digital Literacy:** The capacity to make effective use of ICT.

**E-Government:** The provision of national, regional or local public sector information and public services fully executables through the Internet.

**E-GovTV Channel:** A digital interactive TV channel dedicated to public services, including local government services (e-planning, etc.).

**E-Inclusion:** In the context of e-planning means equal access, for all citizens, to planning information and planning services through ICT.

**E-Planning:** The application of e-government to urban and regional planning. It is the use of information and communication technologies (ICT) in urban and regional planning.

**E-Procurement:** The acquisition through the Internet of goods and services by an organization.

**ICT (Information and Communication Technologies):** Include local computer networks, the Internet, electronic mail, digital television, mobile communications, etc.

**Planning Portal (or Planning Gateway):** The access point in the Internet, where information on urban and/or regional planning issues and services are presented.

**PPGIS (Public Participation Geographical Information System):** A Webgis facility that allows the viewing of plan proposals. It enables the public to participate actively in the planning process.

# E–Pressure through Internet against Monopoly

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## INTRODUCTION

In November 1998, a Czech e-pressure group, Internet proti Monopolu ("Internet Against Monopoly," or IPM), was founded in order to protest planned price increases by the monopolistic domestic telecom operator, SPT Telecom, on fixed-line telephony services. The increase would principally affect local fixed-line calls and, disproportionately, the increasing number of Internet users, whose access calls to Internet service providers (ISPs) are lengthier than voice calls. SPT proposed not only to raise the price for one local-call pulse, but also to shorten it. After four weeks of petitions, boycotts, demonstrations, and negotiations, the group pushed the telecom to ease the data-call pricing structure. The Czech Internet community—computer users, Web operators, and ISPs—thus got organized, which also persuaded the Czech government to modify its telecommunications policy, positively affecting the subsequent proliferation of the Internet.

IPM, on its part, was unique in a number of respects:

1. **Origin:** The founders came from e-media and e-business
2. **Flexibility:** The e-movement was able to organize major protests just two weeks after establishing itself
3. **General Support:** An e-petition was quickly signed by 100,000 e-citizens
4. **Broad-Based Boycott:** A one-day boycott of the monopoly telecom's services by ISPs affected 60% of Czech Internet traffic and was supported by 50% of Internet users
5. **Online Organization:** Public demonstrations were organized and propagated exclusively in cyberspace
6. **Precedent:** Although IPM was the very first e-pressure group in the Czech Republic, it was a significant success

From a technical and economic point of view, the slightly better price package ultimately offered to Internet users may look like a minor victory in a minor war. We should consider, however, the unlikely circumstances under which it was achieved. Czech e-communities in 1998 had a weak political/civic orientation, and predominantly concerned technologies, games, and education. Moreover, e-communities in general have several disadvantages compared with traditional communities, such as anonymity, lack of incentives toward collective action, and inexperience.

In central and eastern Europe in particular, social capital is rather depleted. Decades of communist governments had largely destroyed any sense of "civic society," and thus genuine collective action. Furthermore, people quickly turned to strictly individualistic values given sudden (post-1989) free-market conditions, and rarely engaged in group activities. Civil activism was almost unheard of in post-communist Czechoslovakia and in the Czech Republic. Besides trade unionists and farmers, few others took to the streets in the 1990s. There was, in fact, only one major labor action (by state railway employees in 1995) in this decade of relatively low unemployment in the domestic economy. Moreover, the Czech e-population in 1998 was still small, and regulated prices were raised in other industrial sector as well (gas, electricity, water utilities, rental housing), so telecommunications was not a special case.

## BACKGROUND

### Monopolistic Incumbent

To derive the proper implications from the protests, let us examine the facts. In 1994, the TelSource consortium (51% owned by the Dutch telecommunication market leader, KPN) entered the state-owned SPT Telecom as a strategic partner, buying a 27% share from the Czech government. In the contract, the terms of which were kept confidential for five years, the Czech government promised the consortium managerial control and a virtual monopoly until January 2001; in exchange, TelSource was obliged to modernize the operator's telecommunications infrastructure. The consortium held ambitious plans of expansion into central and eastern Europe, but after KPN suffered economic losses at home, the plan to build a regional powerhouse was abandoned.

On the consumer side, SPT set the price for dial-up and other phone connections to the Internet at a price equal to that of a local call, plus an additional charge for Internet

access. The only, yet partial, alternative to this near monopolist offer was to buy connection to Aliatel's local loops. However, it was very costly for small and medium Internet traffic (approx. 650 euro per month), and was available in only thirteen cities.

On October 29, 1998, SPT Telecom announced a "price re-balancing on the basis of long-term price adjustment schemes" (the so-called Price 99 tariff). The re-balancing meant less costly international calls but more expensive local ones. The company justified the rebalancing by citing EU recommendations in the pre-accession period, and referred to the 2001 liberalization of the Czech telecoms market that would anyway result in price adjustments. Price rebalancing called for an average 25% increase in local-call prices, and an average 25% decrease in the prices of international calls. Overall, the change was supposed to constitute a 3.9% overall increase, or below the annual inflation rate.

In the fall of 1998, four other events took place that, taken together, lead to civic action against the operator. First, days before announcing higher prices, SPT Telecom revised its full-year 1998 profits upward. Profits were projected to increase by 16%, to CZK 33.5 billion (approximately EUR 1 billion), and the profit-to-revenues ratio was supposed to be about 50%.

Second, on November 3, the Czech Telecommunications Office, the sector regulator, banned a long-distance service based on Internet telephony introduced earlier in the year by Radiomobil, a domestic mobile operator. SPT Telecom, as part of the terms of it monopoly on international calls, was prohibited from engaging in Internet call services, and the regulator thus opted for a market-wide ban instead of lifting the regulation imposed on SPT.

Third, SPT Telecom investments were planned to shrink, as CEO Urs Kamber announced in the Czech *MF Dnes* newspaper on October 31 (see Table 1). By the way, this delayed the introduction of the opt-out option (possibility to leave for another operator) in 2001.

Last, but not least, TelSource bought an additional 6.5% stake in SPT Telecom (spending some CZK 8 billion) on the stock exchange in building up a one-third blocking minority (33.4%). KPN CEO Marten Pieters claimed the blocking minority would be used "mainly for decisions about the capital structure in SPT." While this act did not violate the contract between the state and TelSource, which prohibited a more than 34% TelSource ownership, it did signal TelSource's thirst for more control of the company.

*Table 1. SPT Telecom investments and total expenditures*

| Year | Investment (in CZK bil.) | Investment to expenditures (in %) |
|---|---|---|
| 1996 | 30.13 | 93 |
| 1997 | 35.25 | 88 |
| 1998 | 33.23 | 72 |
| 1999 | 18.12 | 35 |
| 2000 | 16.93 | 30 |

*Table 2. Internet 99 vs. previous tariffs (CZK/seconds)*

| Time | Price 98 | Price 99 | Internet 99 +2.60 per data call |
|---|---|---|---|
| 07:00–17:00 | 2.40/180 | 2.60/120 | 2.60/170 |
| 17:00–19:00 | 2.40/180 | 2.60/120 | 2.60/377 |
| 19:00–21:00 | 2.40/360 | 2.60/240 | 2.60/377 |
| 21:00–07:00 | 2.40/360 | 2.60/240 | 2.60/731 |

## Re-Balancing in Detail

The October 29 press release described an on average a 3% increase with Price 99 tariff, but the estimate was far below the value of the effective increase for dial-up Internet users. Rates would be raised for these users by 62.5%, market analysts said (see Table 2).

Another official estimate (25% increase), as announced by TelSource CEO Bessel Kok, was calculated based on an average local call of two minutes. In peak time (07:00-19:00), calls of under two minutes would rise by 8.3%, whereas calls exceeding two minutes would rise by 116%, so the estimate contained a built-in assumption that people would keep call times to under two minutes. This entirely avoided the issue that, on the Internet, the average connection time is significantly longer than two minutes.

# INTERNET RESISTANCE

## Birth of IPM

In the figure previously mentioned, 62.5%, was perceived by Internet professionals as exploitative and discriminatory. Three prominent Czech e-entrepreneurs—Ondrej Neff (owner of a popular e-daily), Patrik Zandl (editor in chief of the most popular technology site), and Ivo Lukacovic (owner of the leading search engine)—founded the IPM e-movement the very day the re-balancing was announced. The triumvirate was not a radical grouping, but a highly representative and credible sample of the Czech Internet community.

IPM immediately launched a Web site, www.bojkot.cz ("boycott.cz"), and posted an e-petition. Surprisingly,

the petition received electronic signatures from 1,800 different IP addresses on the first day, when its existence was spread without the benefit of a campaign. Note that, at that time, established sites such as the one run by Zandl had an average of only 4,000 visits per day.

The e-campaign as such started on November 1, when Zandl wrote a mobilizing article that concluded "and the lighted torches spread quickly on the Web, for e-people hate to be enslaved." Three major portals and several online magazines linked the Boycott site, and thousands of signatures subsequently joined the e-petition. The information became widespread by means of viral marketing, unknown on the Czech Internet until then. TV coverage of the IPM movement made it a headline issue of the day. The critical mass of awareness had been achieved.

Sensitive to the negative publicity ahead of 2001 market liberalization, SPT Telecom started to negotiate with IPM on November 12. The company established a working group whose experts gained time by rejecting the initial IPM proposal of flat-rate monthly fee for Internet connection.

## Boycott and Negotiations

In response to that defensive strategy, IPM organized a boycott of Internet traffic. The aim was not to harm SPT Telecom economically, but to demonstrate the overwhelming support of Internet users in the form of an e-happening. On the boycott day (November 18), users were asked not to connect to the Internet. The Web sites involved showed blank pages, save a banner announcement of the boycott. Internet service provider SkyNET even contributed an economic benefit—customers who did not connect that day earned a 10% discount on their December bill.

The "offline side" of the boycott consisted of two street demonstrations, arranged outside the headquarters of SPT Telecom in Prague and in Brno. IPM employed several symbolic features to make the events compelling:

1. **Color:** Yellow is the company color of SPT Telecom, so IPM used the color on banners, T-shirts, and other campaign material (Note the importance of color identity for mass events, as, for example, in the case of the Orange Revolution in Ukraine in 2004.)
2. **Date:** The boycott date was chosen as November 18. The preceding day is International Student's Day, upon which, in 1989, students in Prague staged demonstrations that sparked the Velvet Revolution, which put an end to communist rule in Czechoslovakia, and upon which, in 1939, students demonstrated against the Nazi occupation of Czechoslovakia, which were violently out down; both were deeply resonant manifestations of protest and will
3. **Nicknames:** Protestors referred to SPT Telecom as Monopolcom and to TeleCommunism
4. **Symbolic Allegories:** At the Prague demonstration, people connected themselves, via ropes and wires—a Web—to a papier-mâché yellow spider consuming a keyboard. Not subtle, but easily worth a thousand words

The e-happening was a major success. First, the e-petition received 100,000 signatures, an incredible number given mild e-readiness in 1998. Major portals and online dailies, in total some 950 sites, supported the Internet boycott. The majority of ISPs (Bohemia.Net, CZCOM, GTS CzechNet, INEC, InWay, OASA, Telenor Internet) participated, while others (CESNET, PVT) at least posted banners, or published supportive official statements. According to the Czech News Agency, 60% of Internet users joined the boycott, and connection time and transferred data volume fell by 50% on the day. Political parties also expressed support for the boycott, including the governing Social Democrats (CSSD). Paradoxically, Finance Minister Ivo Svoboda of the CSSD had approved the SPT price rebalancing. That approval was outspokenly criticized by other party and Cabinet members, including Deputy Prime Minister Pavel Mertlik and Minister for Transport and Communication Antonin Peltran (both CSSD), the latter of whom proposed reopening the terms of the contract with TelSource.

Two days after the boycott and the demonstrations, SPT Telecom came with a new proposal called "Internet 99" (Table 2). ISPs were offered special phone numbers toward distinguishing data calls from voice calls, and special prices on data calls. In attempt to restore its reputation, the company proclaimed that it had been preparing such an offering long in advance of *the boycott* (although it presented no technical details whatsoever) and likened the IPM's action as "breaking into an open door."

The first response of IPM toward Internet 99 was negative, and the major issue became the proposed fixed price (CZK 2.60) per each call. IPM argued that technical mistakes resulting from poor connection quality meant inaccurately billed connections (in SPT's favor). SPT thus made a concession and agreed that the connection

*Table 3. Timetable of events*

| | |
|---|---|
| Oct 29 | Price 99 tariff announced by SPT |
| Oct 29 | Internet Against Monopoly (IPM) founded |
| Nov 1 | E-campaign launched by IPM |
| Nov 5 | TV coverage of IPM (headline) |
| Nov 12 | Negotiations IPM-SPT |
| Nov 18 | IPM Boycott Day |
| Nov 20 | Internet 99 proposed by SPT |

time should not be assessed immediately, but upon the first minute, ensuring that technical problems related to the initial connection would not affect user prices.

Once this had been resolved, IPM found it difficult to ask for something other. Simply put, Internet users could no longer use the "exploitation" argument any more than other SPT Telecom customers could, because Internet 99 reflected the fact that data calls are, on average, less expensive than voice calls. IPM thus agreed to the proposal, securing one modification: an increase of the pulse length to 180 seconds.

## Outcomes

In the end, SPT Telecom revenues were not significantly affected by the Internet 99 tariff. The demand for e-connections rose because of the lower data-call price and with the raised visibility of the Internet. Zandl (2001) estimates that revenues lost related to the price decrease were fully compensated as early as in 2000. And what of the gains and losses of the e-population?

The special price package Internet 99, later renamed as Internet 2000 and Internet 2001, was particularly beneficial for households. The main reason is that the price for the 21:00-07:00 slot was extended to cover the whole of weekends and holidays. On the other hand, the pricing policy did not benefit institutions and companies, and for brief data calls (below eight minutes), the final charge was higher than proposed in the Price 1999 proposal (because of the fixed CZK 2.60 per each data call). As a result, Internet traffic shifted to lower-fared hours, and average connection time rose.

SPT Telecom unified access numbers so that users from areas without ISPs would pay intraregional rather than interregional call rates. This further boosted Internet development in less-populated districts. On the other hand, the measure only involved ISPs with sufficient access points, and access unification went into effect only with the Internet 2000 tariff.

The increase in consumers connected to the Internet led to revenue-sharing arrangements between ISPs and telecom operators. In 2000, Dattel negotiated the first such contracts, and SPT Telecom copied the business model. This stimulated Internet growth. The higher societal visibility of the Internet was a direct consequence of IPM's activities, and surely helped particularly those e-businesses and e-media that led the boycott.

Furthermore, the IPM movement induced the Czech government to reassess its regulatory policy toward telecommunications. TelSource was no longer perceived by the government as a suitable strategic partner, and it was no surprise for the government when TelSource lost interest in SPT Telecom after full-market liberalization in 2001.

*Table 4. Hourly costs of data calls (in CZK)*

| Time | Price 98 | Price 99 | Internet 99 |
|---|---|---|---|
| 07:00–17:00 | 48 | 78 | 57.7 |
| 17:00–19:00 | 48 | 78 | 24.4 |
| 19:00–21:00 | 24 | 39 | 24.4 |
| 21:00–07:00 | 24 | 39 | 15.4 |

## FUTURE TRENDS

What are the implications of the IPM pressure for e-communities, and how effective is e-pressure compared with traditional forms of consumer pressure? First, success comes with broad, ready-made coalitions, from e-media and e-business communities, and from blog writers, ISPs, and Webmasters, especially when they resort to activities that take little time, such as circulating e-petitions. Large networks facilitate the spread of information, and lend credibility. In particular, the support of e-dailies (informational politics) is of key importance (Davis, Elin, Reeher, 2002). A group also needs a collective potential. Political alienation signaled by the decline of participation in traditional political parties and traditional interest groups may not reflect a lack of interest in collective action as such. IPM broke a "spiral of silence" (Noelle-Neumann, 1986) in an environment seemingly unfit for collective action.

Second, e-communities emerge quickly when the freedom of the Internet is at stake. Therefore, one can see low prospect for Internet regulation given this likely resistance. Moreover, technical options, such as relocating Web sites to different jurisdictions, would be another obstacle.

## CONCLUSION

This article documents the case of a successful e-pressure movement, but some qualifications must be raised. Most importantly, IPM consisted of only three persons in order to maintain operative flexibility. However, sustained activities require hierarchy, clearly defined goals, and properly allocated competencies. It is not clear if competing e-factions could be kept under control otherwise. In the case of IPM, many people were finally dissatisfied, and some accused the IPM of ultimately being corrupted.

In addition, an ever-present issue in all e-pressure activities is who to lobby. IPM limitedly targeted SPT Telecom, but regulators and governmental ministries—who approved the original pricing scheme—were the

institutions in charge of the national telecommunications policy. Negotiations with ministries would then have proved a delicate, multiple-sided political issue, quite different from a clash between an ad hoc private group and a monopolistic company.

Finally, the Internet is a mercurial communications network, in which interest is quickly generated but just as quickly lost. IPM recognized that the majority of ordinary consumers lacked dedication or interest in examining the complicated details of the Internet 99 proposal when it was presented in the media, and thereby IPM lost much of thus-achieved bargaining power. Delay in negotiation is the prospective Achilles heel of e-pressure.

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## KEY TERMS

**Avalanche Marketing:** The distribution of positive product (or other) information by consumers. For political and interest-group causes, the Internet is an ideal conduit of avalanche marketing—messages can be multiple, the costs of reproducing the information small or nil, and private networks vast and interconnected.

**Collective Action:** The problem of collective action is that while an individual may find it useful to participate, since the benefits are distributed in the entire group the individual has a rational incentive to behave as a free rider. Each group willing to organize collective action thus has to overcome the problem of collective action. On the Internet, low-cost instruments such as e-petitions can mitigate the problem of collective action (i.e., that the individual cost/benefits do not match the social costs/benefits).

**E-Petition:** An online petition is a cost-effective pressure instrument. The costs of administering the petition are negligible for the owner, and signatories find it an easy way to indicate support. In addition, those petitioned are not presented with direct pressure to sign, and can easily and concurrently gather additional information, thus enriching their decision.

**Natural Monopoly:** Large-sized telecommunications suppliers have long been considered as "natural monopolies" deserving of special regulation. Natural monopolies are defined by declining marginal costs in all scales of production, which implies that the production of the entire market is most effectively provided by a single company. However, in order to achieve a socially efficient price, price should equal marginal costs, which is impossible for the monopolistic company, since revenues would then not cover costs. Natural monopoly, if unregulated, would therefore increase prices, and produce socially sub-optimal product amounts. Regulation is required to ensure effective production. Globalization and technological development make the concept of natural monopolies increasingly less relevant.

**Viral Marketing:** See Avalanche Marketing.

# E-Rulemaking



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## INTRODUCTION

Throughout the world, governments use regulation to combat monopoly power, protect consumers, and reduce health, safety, and environmental risks. Regulation promotes the safety of transportation, the cleanliness of the air, and the quality of their food and drugs. Today, nearly every major aspect of contemporary public life is significantly affected by rules made by regulatory agencies, ministries, or bureaus (Kerwin, 2003).

Given the consequential and complex nature of regulatory decision-making, crafting rules presents government agencies with significant informational challenges. Government regulators must collect information to understand the causes of regulatory problems, identify available regulatory options, and predict the effects of each alternative (Coglianese, Zeckhauser, & Parson, 2004). To develop a new rule, regulators must often undertake extensive studies and analyses and respond to comments from industry groups and other interested organizations.

E-rulemaking—or the use of information technology in government rulemaking—promises to help regulatory agencies make rules more efficiently and with better quality (Brandon & Carlitz, 2002; Johnson, 1998). E-rulemaking may also help expand public access to and participation in government decision making. Despite the significance of regulatory decisions, they have often been made in relative obscurity, with organized business lobbies sometimes having disproportionate influence over policymaking. Information technology may facilitate greater transparency and democratic accountability in the rulemaking process.

Already, regulatory agencies are making use of information technology to create Websites containing notices of new regulatory proposals and various background documents. They have also begun to allow citizens to use the Internet to share comments on new regulatory policies or engage in online dialogues (Beierle, 2003; Brandon & Carlitz, 2002). In early 2003, for example, the United States government launched a new Web portal called Regulations.Gov that allows the public to locate and comment on all new regulatory proposals announced by hundreds of federal regulatory agencies (Skrzycki, 2003). In addition, American officials are currently at work developing a government-wide, online docket system that will make available all the extensive information contained in each agency's rulemaking files (Skrzycki, 2004). Efforts such as these are likely to continue and can be expected in other regulatory jurisdictions around the world.

## BACKGROUND

In order to understand how information technology can be used in the rulemaking process, it helps to understand the basic contours of that process. By way of illustration, consider how rulemaking operates in the United States for agencies like the Environmental Protection Agency, Department of Agriculture, and Federal Aviation Administration. These agencies typically first develop plans or "regulatory agendas" that are published twice each year in the *Federal Register*, a daily publication that includes regulatory notices and other material submitted by federal departments and agencies.

As agencies work on the items included in their agendas, they gather information, conduct analysis of the underlying problem, and identify possible regulatory solutions. They also frequently engage in discussions with industry representatives, other organized interests, and staff members from Congress or other agencies (Strauss, Rakoff, & Farina, 2003). When an agency has reached a tentative decision, it proceeds to publish a notice of proposed rulemaking (NPRM) in the *Federal Register*. In addition to describing the proposed rule, the NPRM will usually enunciate reasons for the proposed new rule and discuss the agency's underlying regulatory analysis (Administrative Procedure Act, 1946). The NPRM also informs interested parties how they can submit comments to the agency over its proposed course of action.

After reviewing the comments submitted on the NPRM and conducting any further analysis, the agency staff will make revisions to the proposed rule and then publish the final rule in the *Federal Register*. In addition to publishing the operative rule itself, the agency will also explain its decision in a preamble, a section of the *Federal Register* that accompanies the final rule. These preambles will often be longer than the final rules themselves, sometimes spanning more than a hundred pages for a single new rule.

Even after the final rule is published in the *Federal Register,* the rulemaking process continues (Coglianese,

2001). The operative rule itself, without the preamble, is later moved to and published in the relevant section of the *Code of Federal Regulations*. Furthermore, businesses or nongovernmental organizations can take the agency to court over new rules. Depending on what happens in litigation, the regulatory agency may need to revise its rules, which would start the entire process over again.

## E-RULEMAKING'S PROMISE

Interest in applying information technology to the rulemaking process is growing (Shulman, Thrane, & Shelley, 2005). Already, regulatory agencies in the United States and other countries have begun to apply information technology to the rulemaking process. Agencies now permit members of the public to submit their comments by e-mail; they make the contents of their regulatory dockets available on the Internet; and they use information technology to help agency managers track the progress of rulemaking staff (Brandon & Carlitz, 2002). These existing applications only scratch the surface of information technology's potential for government rulemaking.

Researchers and public officials are contemplating a variety of new applications of digital technology in an effort to help government agencies improve the process of rulemaking—and thereby also to improve the quality of the rules themselves. Since making rules requires the acquisition, processing, and analysis of large quantities of technical and time-sensitive information, systems for information retrieval and extraction can aid the work of the regulatory analysts. Analysts could also use text categorization technology to sort public comments based on the issues they address or the departments within their agency to which they refer (Shulman, Hovy, Callan, & Zavestoski, 2004; Lau, Law, & Wiederhold, 2005). Summarization systems could automatically condense large studies or comments into more useable size for government officials to digest.

In addition, information technology can help regulators draft the text of new rules or supporting documents. Systems could be designed to flag potential inconsistencies within a proposed rule or between the proposed rule and existing rules. In order to maximize the regulated community's understanding of its obligations under a new rule, drafting software could suggest alternative sentence construction to make rules simpler and more accessible to a broad audience. Rule compliance wizards available on an agency's Web site could also help ensure that regulated entities understand and meet their regulatory obligations, even in areas with complex systems of rules (Kerrigan & Law, 2005).

Information technology can be used in a variety of ways to inform citizens about government rulemaking. Agencies can easily create automatic alerts to inform interested citizens about proposed rules under development. To help citizens offer more informed comments, information technology could provide clearer or easier access to information about a rule's development. Agencies could develop simulation software that would show how the costs and benefits of a proposed rule would vary under different parameters or assumptions, and then make that software available for the public to use to develop a better understanding of the tradeoffs implicit in a rulemaking (Belton, 2000).

Information technology could also create new opportunities for public deliberation over rulemaking. Information technology could allow members of the public to submit questions to the agency or engage in ongoing dialogue with agency staff or others interested in a proposed rule. In addition to online chat rooms, agencies could conduct digital public hearings or even convene cyber-juries that would link citizens from across the jurisdiction to deliberate over core policy issues raised by a rulemaking (Coglianese, 2005).

## GOALS FOR E-RULEMAKING

As these examples show, e-rulemaking encompasses a range of new digital government applications. Some of these applications use existing technologies simply to digitize the existing rulemaking process, such as by providing documents online or allowing the submission of electronic comments. However, new applications also have the potential to transform the existing rulemaking process in significant ways (Lubbers, 2002). Whether applying existing technologies or designing new ones, decisions about whether and how to apply e-rulemaking call for attention to e-rulemaking's goals. E-rulemaking is generally thought to have the capacity to advance one or more of the following goals (Coglianese, 2004a).

1. **Enhance Democratic Legitimacy:** Increasing democratic legitimacy could be accomplished by using information technology to increase public understanding of rulemaking, make the process more interactive and deliberative, and make it easier for more democratically accountable institutions, such as the legislature, to oversee the rulemaking process
2. **Ensure Better Decisions:** E-rulemaking could improve policy decisions by making it easier for regulatory officials to analyze large volumes of data drawn from multiple sources. Simulation software

could help analysts make better predictions, and other technologies could make it easier for agencies to rely on routine use of high quality economic analysis

3. **Reduce Administrative Burdens:** Information technology can enable agency managers to coordinate rulemaking staff and other resources more efficiently. To date, a few agencies have reported some cost savings from initial applications of e-rulemaking for storage of documents
4. **Expand Regulatory Compliance:** Agencies can use information technology to increase compliance both by increasing public understanding of what regulations require and also, possibly, by reducing the cost of compliance through compliance assistance software.

## FUTURE TRENDS

To achieve measurable improvements in meeting these goals, research will be needed from across both the information sciences and the social sciences (Coglianese, 2004b). Information science research will be crucial for technological design, such as developing text categorization and summarization tools for the rulemaking environment. Social science research will be needed to understand better the professional tasks of regulatory decision makers as well as the organizational environment within which technologies will be deployed. With coordinated input from across multiple disciplines, digital government researchers will be able to develop still more effective uses of information technology and better design rulemaking institutions to make better use of such technology. Future research directions will span four main areas (Coglianese, 2004a, 2004b).

1. **Information Technology:** E-rulemaking raises a series of challenges for research in the information sciences, such as designing general simulation and modeling packages or software to conduct automated consistency checking or cross-indexing and linking to related documents (Hovy & Noveck, 2004). In addition, human-computer interface research will help ensure that systems will be easy for the broad public to use and will therefore facilitate greater public participation. Any increase in citizen involvement will generate the need for information technology to help process and categorize public comments
2. **Agency Management:** E-rulemaking will give rise to a number of research questions in the field of public management or related areas of institutional or legal analysis. It will be important to study the effect on regulatory officials and their institutions from the introduction of new information technologies (Fountain, 2001). Do these technologies actually achieve their goals of improving regulatory decisions? Do agency staff members use these systems in the ways they were designed? How does the institutional environment affect the efficacy of e-rulemaking
3. **Public Participation:** Since e-rulemaking can affect how members of the public interact with government, political science research can help understand how information technology affects the involvement of businesses, interest groups, and citizens in the rulemaking process (Shulman, 2004). Such research can help assess whether information technology actually improves public understanding of rulemaking or increases the number and quality of comments filed. Of equal value will be to understand whether the types of participants in the rulemaking process change, or whether the proportion of comments from industry continues to dwarf the proportion from ordinary citizens (Coglianese, 2005). Social scientists will also be able to help determine whether e-rulemaking affects the public's overall perception of legitimacy to government regulation
4. **Regulatory Compliance:** A final avenue for future research would focus on how e-rulemaking can address regulatory compliance. Basic research on the factors that affect compliance with regulations will be helpful in identifying ways to use information technology to improve compliance. In addition, research could investigate how different kinds of compliance assistance software affect regulated actors' knowledge of rules and the obligations they impose (Kerrigan & Law, 2005). In addition, research could identify ways to use technologies such as remote sensing to supplement traditional enforcement tools

## CONCLUSION

Government rulemaking affects the most significant aspects of today's economy and society. Given the importance of rulemaking, it is not surprising that government officials are beginning to investigate information technologies that can promise to improve regulatory decision-making. Regulatory agencies may be able to deploy e-rulemaking technologies to improve their information collection and regulatory analysis, enhance their interaction with the public, and ultimately implement their rules in a more effective manner.

E-rulemaking may be able to advance important goals of democratic legitimacy, improved decisions, lowered administrative costs, and increased compliance. Research will be needed to determine whether specific applications of e-rulemaking actually serve these goals. Researchers working across both the information and social sciences can help design information systems that fulfill institutional requirements and improve the rulemaking process. Building and sustaining research on e-rulemaking should be part of any strategy to improve the way government makes rules that will in turn affect every major aspect of society.

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## KEY TERMS

**Code of Federal Regulations (CFR):** The CFR is the annual publication of all federal agency regulations currently in force, with rules organized by subject matter.

**Federal Register:** The Federal Register is a daily publication in which federal agencies publish proposed and final rules as well as other announcements. Rules published in the Federal Register are organized in chronological order.

**Final Rule:** After receiving public comments, agencies publish their final rules in the Federal Register. In addition to the text of the rule, the agency must publish a statement justifying the rule. Such a statement will usually include a discussion of the major policy issues involved, the evidence relied on for the decision, and a reply to any counterarguments presented in the public comments.

**Notice-and-Comment Rulemaking:** Notice-and-comment, or informal, rulemaking is a process in which the agency publishes a proposed rule, receives public comments, and then publishes a final rule without holding a formal hearing on the record. Notice-and-comment rulemaking is the most common way for agencies to issue regulations.

**Notice of Proposed Rulemaking (NPRM):** Agencies must publish a notice of proposed rulemaking in the Federal Register to inform the public of the underlying legal authority of the proposed rule and its specific terms. The NPRM also contains information about when and where to submit public comments.

**Preamble:** When an agency publishes a notice of proposed rulemaking or a final rule in the Federal Register, it also publishes a statement explaining the purpose and background of the rule. This statement is the preamble. For final rules, the agency also responds to public comments in the preamble.

**Regulatory Agenda:** The Regulatory Flexibility Act requires that agencies publish a regulatory agenda twice each year containing a description of the subject area of rules that the agencies intends to propose, an approximate schedule for completing action on rules that the agency has already proposed, and a listing of recently completed rules.

**Regulatory Docket:** All materials and information related to a rulemaking are compiled in a regulatory docket. The docket includes studies, comments, and any other information on which the agency relies in developing a rule.

# E–Service Provision by New Zealand Local Government

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## INTRODUCTION

Historically, information and services can only be obtained through narrow, one to one, phones, and agency-specific shop fronts (Caffrey, 1998). Information technology, especially the Internet, opens possibilities of using methods to distribute information and deliver services on a much grander scale. The Internet provides a foundation for a variety of communications media. The Web is one of the most important media built upon the Internet. It can be accessed from almost anywhere in the world by means of computers and electronic devices; it is possible to elicit more information, establish platforms for online payment, online consultation and e-voting. Security concerns can be overcome by data-authentication technologies.

It can deliver government services and encourage greater democracy and engagement from citizens. Governments around the world are exploring the use of Web-based information technology (Grönlund, 2002). Attention has focused on the design and delivery of portals as a major component of government electronic service infrastructures. The N.Z. government portal site (http://www.govt.nz/en/home/) or the Local Government Online Ltd (LGOL) Web site, (www.localgovt.co.nz/AboutCouncils/Councils/ByRegion/) are examples.

Since the mid-1990s governments have been tapping the potential of the Internet to improve and governance and service provision. "In 2001, it was estimated that globally there were well over 50,000 official government Web sites with more coming online daily. In 1996 less than 50 official government homepages could be found on the world-wide-Web" (Ronaghan, 2002).

Local governments are faced with growing demands of delivering information and services more efficiently and effectively and at low cost. Along with the rapid growth of technological developments, people demand high quality services that reflect their lifestyles and are accessible after normal office hours from home or work. Thus, the goals of delivering electronic government services are to simplify procedures and documentation; eliminate interactions that fail to yield outcomes; extend contact opportunities (i.e., access) beyond office hours and improve relationships with the public (Grönlund, 2002).

Having an effective Web presence is critical to the success of local governments moving to adopt new technologies. Of equal importance is the evaluation of Web sites using different manual and automated methodologies and tools. In this study an evaluation of local authority Web sites was conducted to gain a practical understanding of the impact of the Internet on local governments in New Zealand using a tailor-made model specific to local governments. Issues studied focused on the information and services provided by the local authority Web sites. What is more important is whether the local government operations can or are able to support the expectations for speed, service, convenience, and delivery that the Web creates. Through identification of best practice Web sites and a set of evaluation methods and tools, this paper will provide a set of design guidelines to local authorities that would benefit and better meet the needs of their local communities.

## BACKGROUND

New Zealand local government, created by statute of the central government, is one of the two branches of government in New Zealand. There are in total 86 councils, 12 from Regional, 15 from Territorial-City, 59 from Territorial-District (including the Chatham Islands and four unitary Councils that have regional functions). All 86 local authorities from four different sectors represent multiple functions and accountabilities on their Web sites. While regional councils focus on biosecurity control, harbour navigation and safety, land transport, and regional civil defense; city and district councils are responsible for community well-being and development, environmental health and safety, infrastructure, recreation and culture, as well as resource management.

*Table 1. Web-site evaluation criteria*

| CATEGORIES | | CRITERIA |
|---|---|---|
| INFORMATION | Authority Information | Web-site host: Councillor profiles, Council structure, and history of Councils |
| | Customer Information | Council's audiences: Ratepayer/Nontatepayer, residents, visitors to the site, and businesses |
| | Informational Services | News/Events, Tourist/Visitor, Property and Rates, Water, Public, Community, Environmental, Economic, Local Governance Statement, Democracy, and Publications and Reports |
| | Transactional Services | Water, Rates, Property and Cemetery Search, Billing and Payment, GIS and Mapping, and Feedback |
| | Other Information | Links to external or useful sites (e.g., Library, Government Portals, and Tourism) |
| LEGAL STATEMENTS | | Legal Disclaimer, Privacy Statement, Security, and/or Copyright |
| PROMOTIONAL/ RETENTION | | Newsletter, Climate, Photo Gallery, Employment, and Contact |
| NONFUNCTIONAL REQUIREMENTS | | Aesthetic Effect, Ease of Use, Innovation, Navigability, and Performance |

New Zealand central government launched an e-government strategy in 2001 that brings all government agencies together, including local governments, using the Internet and e-commerce applications to better provide citizens and businesses with government services and information (State Services Commission, 2004a). The e-government strategy also provides a set of Web development guidelines, which forms the standard for public sector Web sites in New Zealand.

In achieving the goals of the e-government strategy, local government has collectively developed an e-local government strategy in 2002 to increase online access to local government information and improve public participation in decisions. Such strategy emphases on: access, innovation, participation and leadership. Easy access means a set of core information provided by all councils and accessible through their Web site and the central government portal, and a set of templates for the standard information that all councils provide. There are also options for transactional systems, online billing and secure payment systems being formulated. The role of local governments is to try to present a somewhat consistent interface for the citizen and to try to develop policy for the appropriate release of government held information to the Internet community (Bursztynsky and Kirking, 1996).

## EVALUATION OF LOCAL AUTHORITY WEB SITES

Criteria for evaluation of the local authority Web sites were grouped in four major categories and 30 subcategories: Information, Legal Statements, Promotion/Retention, and Nonfunctional Requirements. This evaluation model was adopted from Hersey's (Whiteley, 2000) e-commerce Web site evaluation model and Paynter and Chung's (2001) usability model and tailored to suit the relevancy of the local authority Web sites. This approach was proven to be effective and appropriate from previous Web site evaluation studies, namely: Internet banking (Chung, 2001), travel industry (Satitkit, 2001) and Internet mortgage service provision (Lu, 2002).

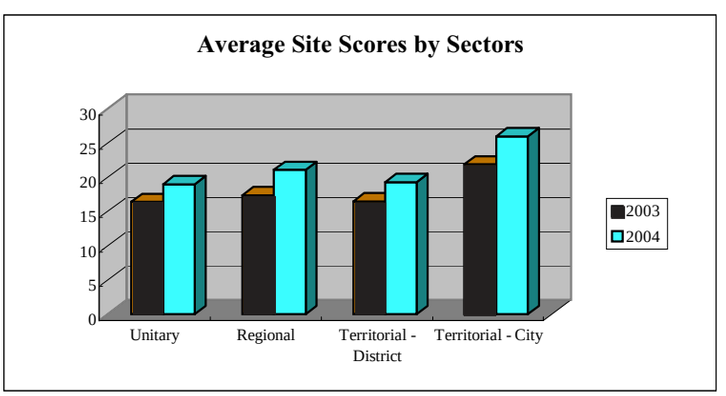
Two rounds of evaluation were conducted with the first round done between April and June 2003, and the second one was between February and March 2004. This is to ensure that the site examination was up-to-date and that the changes and enhancement made to the Web sites were also examined. In the second round, four additional subcategories were added to the criteria, making a total of 34. The reason for the change was due to 2002 legislation whereby regional councils were empowered to collect levies separately. 2004 was also the local government election year. Details of the categories are illustrated in Table 1.

All 86 local authority Web sites were evaluated using a binary code scheme of "1", which denotes the presence of elements/characteristics and "0", which reflects the absence. The content analysis focused on two aspects: the site score was used to rate the performance of local authority Web sites, while the element score assessed the adoption of elements in designing the local authority Web site. A quantitative approach was used for counting, calculating and summing the frequency of each element across each site.

*Table 2. Local authority Web sites score summary*

| Comparison | First Round 2003 (Total Local Authority Sites = 84) (Total Elements = 30) | | | Second Round 2004 (Total Local Authority Sites = 85) (Total Elements = 34) | | |
|---|---|---|---|---|---|---|
| **Site Scores** | Low (17 or lower) | Medium (18 to 21) | High (22 to 27) | Low (17 or lower) | Medium (18 to 24) | High (25 to 33) |
| **Percentage** | 39 (46.4%) | 30 (35.7%) | 15 (17.9%) | 21 (24.7%) | 47 (55.3 %) | 17 (20.0%) |
| **Summary** | • The top 15 scorers are: Territorial-City (9) and Territorial-District (6).<br>• The 30 medium scorers are: Territorial-District (20), Regional (6) and Territorial-City (4).<br>• The 39 low scorers are: Regional (6), Territorial-City (1), and Territorial-District (32).<br>• Overall, the Local Authority Web sites performed well with an average score of each site at 17.1, that is, higher than 15, 57% of the elements specified in the evaluation model.<br>• Most of the sites studied provide comprehensive and relevant information with good organisation of site content and easy navigability. They scored very well in "Information" category but very badly under "Legal Statements" and "Transactional" information. | | | • The top 17 scorers are: Territorial-City (11) as the biggest player, Territorial-District (4), Regional (1) and Unitary (1).<br>• The 47 medium scorers are: Territorial-District (33), Regional (9), Territorial-City (3), and Unitary (2).<br>• The 21 low scorers are: Regional (6), Territorial-City (1), and Territorial-District (14).<br>• Overall, the Local Authority Web sites performed well with an average score of each site at 20.6, that is, higher than 17, 61% of the elements specified in the evaluation model.<br>• Some of the councils improved their sites by adding new and innovative features, such as Property and Cemetery search, GIS mapping, Webcam, and downloadable permit application forms. A few councils even introduced online rates payment and e-bill. The use of "Legal Statements" in local authority Web sites also increased. | | |

*Figure 1. Average score of local authority Web sites, by sectors*




## RESULTS AND FINDINGS

### Site Score Findings

In New Zealand, about 97.7% of the local authorities have a Web presence, and most of whom have operated for more than 5 years. Almost all of the sites are informational although there is a limited range of transactional services available on some of the sites. The overall performance of the local authority Web sites is summarised in Table 2.

Overall, the top scorers spread across all sectors, with Territorial-City (21.9 in 2003 and 26 in 2004) being the biggest player, and dominating most of the high scores among four local government sectors. This is probably

*Table 3. Local authority Web sites element score summary*

| Services | Categories | Category Scores | | | | | Summary |
|---|---|---|---|---|---|---|---|
| | | Total | Elements | | | | |
| | | | No | Ave. | Max. | % | |
| First Round (2003) | Informational Services | 737 | 12 | 61.4 | 84 | 73.1 | ▪ The majority of sites are non-functional and informational rather than transactional.<br>▪ There is a lack of transactional and interactive capabilities in most of the sites. |
| | Transactional Services | 51 | 4 | 12.8 | 84 | 15.2 | |
| | Legal Statements | 113 | 4 | 28.3 | 84 | 33.7 | |
| | Promotion/Retention | 242 | 5 | 48.4 | 84 | 57.6 | |
| | Non-Functional | 330 | 5 | 66.0 | 84 | 78.6 | |
| Second Round (2004) | Informational Services | 882 | 14 | 63.0 | 85 | 74.1 | ▪ More councils started improving online transactional capabilities and increasing use of legal statements.<br>▪ Some Councils concentrate on promoting tourism while others on providing more up-to-date information and services. |
| | Transactional Services | 124 | 6 | 20.7 | 85 | 24.4 | |
| | Legal Statements | 137 | 4 | 18.7 | 85 | 40.4 | |
| | Promotion/Retention | 261 | 5 | 18.75 | 85 | 61.4 | |
| | Non-Functional | 350 | 5 | 12 | 85 | 88.2 | |

because of the conspicuous role that city councils take, as being the biggest councils and having the highest populace, and the privileged resources from which city councils benefit in terms of capital and people. This observation (Figure 1) suggests that there is a strong relationship between a good Web site and the size, capital, resource, function, and business strategy of an organisation.

## Element Score Findings

The average element scores indicate that local authorities tend to pay more attention to aesthetic (nonfunctional) features than providing comprehensive capability. The overall performance is summarised in Table 3.

### Informational Services

The majority of sites provided detailed information and good content organisation (73.1% in 2003 and 74.1%% in 2004). However, not many of the sites provide customer-focussed activities such as e-subscription and e-consultation. Only one council, Auckland Regional Council, provides an online forum for discussion and sharing of ideas. None of the sites provide any e-democracy, although some sites have put up information about Elections 2004. Dunayev (2005) used an automated tool to analyse all the local government Web sites. He concluded that the sites did not appear to have matured sufficiently to meet the goal of online local government elections in the next cycle (2007). Some of the obstacles to e-voting are outlined in Sharkey and Paynter (2003) and steps towards an e-voting transition in Paynter and Peko (2005).

While the appeal of the Internet lies in its ability for personalisation (Venkatraman, 2000), none of the sites examined provides such functionality. Only one council, Dunedin City Council, implemented a Citizen Direct system to enable citizens to access council-held information about them 24/7 using a usercode and password.

### Transactional Services

About 44% of the sites examined provide rate and property search, 34% have cemetery search, and only 12% provide mapping information and interactive tools such as GIS mapping. Only five councils offer online billing and payment capabilities, two of which (Auckland Regional Council and Auckland City Council) provide online payments by credit cards, and the remainder (Manukau City

Council, Central Hawkes Bay District Council, and Hutt City Council) provide e-billing in conjunction with New Zealand Post. None of the sites provide online permit applications and processing.

### Legal Statements

Most of the sites did not perform well under this category. However the situation improved in 2004, partly due to feedback from the study. The use of legal disclaimer increased from 25% in 2003 to 44.7% in 2004; privacy statement from 17% to 29.4%, terms of use from 15% to 22.4%, and security/copyright statement from 43% to 64.7%.

### Non-Functional Requirements

All sites did well with respect to navigability, page loading, the use of graphics and animation, and content presentation. When we consider ease of use, we look at the search capabilities, site maps, internal links and searching tips. Although the overall navigability of the sites was considered good with the use of location indicator and search engines, facilities such as online help and searching/viewing tips appear at relatively few local authority sites. In certain sites even the searching tips are not very helpful.

## DISCUSSION

In order to determine how well the New Zealand local government Web sites perform against their counterparts in the United States, UK, and Australia, we did a comparison using 23 categories developed by Access to Electronic Legal Information Committee (2003) in the States, which is specific for the e-local government strategy among five top local government sites. The result is shown in Table 4.

Biehl (2001) commented that the design, content, and interactivity of the Seattle site are the best at any level of government. Its site had recently been redesigned to include new features such as Watch Council Meetings Live and View Live 911 Dispatch. The Sunderland site provides a wide range of online services targeted for four main types of audiences: residents, visitors, businesses, and youth under 25. What set them apart are the e-consultation and personalisation functionalities that are not readily available on any of the Web sites studied. E-subscription is provided at the Sydney site for citizens to subscribe to news release service and image gallery. E-commerce is also available for purchasing council publications online using credit cards. The Dunedin site was rated first in the 2003 round of assessment. The site provides excellent information, comprehensive viewing tips, and interactive tools. It is such a good site that councils from overseas (e.g., UK) and New Zealand (e.g., Kaipara District) seek to model it. Hutt City site was rated first in the 2004 round for its simplicity, breadth of information and good organisation of content. It is one of the few councils that introduced e-bill, in conjunction with New Zealand Post. This allows ratepayers to pay rates and other payments online.

After eliminating the geographical, functional and demographical differences among the four nations, the comparison shows that New Zealand is still lagging behind its international counterparts in terms of global positioning, marketing strategies and collaboration within government agencies. This is evident in the absence of a second language, and links to all external local government Web sites and the e-government portal. There is also a lack of transactional and interactive capabilities for online payment, online permit applications, and an e-consultation forum for citizens to interact with their local authorities.

Users of the services were surveyed to highlight their priorities. Having detailed and up-to-date information, easy navigability, faster response and faster page loading speed are of major concern. Of less importance was information regarding forthcoming elections and results of elections. Since there is such abundant information and services available on the Web, local authorities need to structure the content and present the information/services in a way that it is easily accessible by customers/citizens. The survey also highlighted that councils need to raise the awareness of their Web sites to citizens, as people are generally ignorant about the range of services that are offered.

*Table 4. Overseas local government site comparison*

| Overseas Web Site | Score | Rank |
|---|---|---|
| City of Sunderland (U.K.) | 20 | 1 |
| City of Seattle (U.S.A.) | 19 | 2 |
| City of Sydney (Australia) | 19 | 2 |
| Hutt City (New Zealand) | 14 | 3 |
| Dunedin City (New Zealand) | 12 | 4 |

## FUTURE TRENDS

### Informational Services

Only one local authority site, South Taranaki District Council has a mirror site in Chinese. To support multiculturalism and meet the needs of international audi-

ences, local authorities should present content in other languages. Making local authority Web sites accessible to people with visual impairments and other disabilities was not evident in this study. Farkas and Farkas (2002) suggest that text-to-voice Web browsers, often used by people with visual impairments, can read HTML, but not graphics files. Designers can insert text-only navigation menus at the bottom of each Web page in addition to graphical buttons and navigation bars.

To allow a closer liaison and more seamless transition between the services and information provided by local and central government, local authorities should provide links to relevant sites in other agencies, in particular, the government portal and other local authority sites.

Interactivity is the key advantage of a Web site over all preceding communications media and makes it possible for local governments to add significant value and convenience for their citizens. Online forums facilitate discussion and the sharing of ideas between councils and citizens, and among citizens themselves. "Personalisation is not about getting more of what you want, but about getting less of what you don't want" (Sterne, 2001, p.181). With a general overflow of information on local authority Web sites, e-personalisation allows users to create a personalized view of the information they need.

### Transactional Services

The ability to apply permit online, and to pay fines, license fees, and rates online with credit cards will provide convenience to users. To reduce the risk for both citizens and local authorities, the State Services Commission (2004b) suggests that personal information including payment information (such as credit card details) must be encrypted between user and agency using Secure Sockets Layer (SSLv3) protocol as a minimum.

### Legal Statements

Local authority Web sites should provide a disclaimer, if they must disclaim content, a privacy statement, and a copyright statement, as well as terms of use or conditions of use. The privacy statements must be clearly worded and unambiguously, especially on relevant forms, and should be linked to more detailed privacy codes of practice if necessary.

### Non-Functional Requirements

To improve searchability and avoid irrelevant results, search zones (Farkas et al., 2002) can be used, especially with medium and large Web sites such as that of Auckland City Council. A search zone consists of a drop-down list box through which users can restrict their search to a single category in which they are interested. Ideally, users should be able to access "Search" from almost every page in the Web site and a link to simple and jargon free searching tips would appear alongside a search form on each Web page. Navigation can be a lot easier if there is a clear, complete, and simple home page always accessible with a link from other pages shows users how the content is organised (Zimmerman, 2001). The site index should be available from every page and contain active internal links to the desired page(s). Users generally expect timely, relevant, reliable, and valid. There are no strict rules on update frequency, which often depends on the types of information available on the site, but a regular review of site content will be useful. For some larger sites, Zimmerman (2001) suggests that it may be more efficient if editing tasks can be divided among many staff members and departments.

## FUTURE RESEARCH

The information and services provided online via the local government Web sites is constantly undergoing evolution partly driven by innovations in information technology (IT), partly by the local government wishing to leverage this tool and to a minor extent by user demand. As a consequence, reevaluation of the effectiveness of the local government Web sites is a necessary as well as comparisons with overseas local government Internet presence. Therefore, a longitudinal study on local government Web sites is being undertaken. We also need further to consider the relationships between the various local governments and their service providers. An example would be the COL (Collaborative Community Online) program organised by Local Government Online to provide a template Web site designed to meet the common e-government requirements of a local authority. This template will be used across local authorities. So far about 14 local authorities have developed sites to the COL plan (Bell, 2004).

Questions about the digital divide, including access to users of different languages and abilities are incorporated in the 2005, as is an emphasis on the provision of broadband services and the allowance for different platforms such as PDAs and mobile telephony.

## CONCLUSION

The evaluation of local authority Web sites provided key insights into how the Internet was embraced in the context of local government in New Zealand. Almost all councils

have developed comprehensive Internet sites. Leading local government Web sites that achieved a high score offer the online capacity to provide a range of information from current events to rating information. However, local government has yet largely to adopt the Internet to provide interactive services from drainage applications to water payments. Results from the two rounds of assessment show that rapid improvements in functionality could be expected, as local governments are proactive in improving their Web sites and promoting their use to the populace. Apart from continuing to add new functionality to service their diverse stakeholders, local governments need to concentrate their efforts on presenting government business applications, such as voter registration, permit assistance or payment of parking fines. The Internet help ease citizen access to necessary government services and functions, with a comprehensive and well-designed Web site, local government can ensure a continuous stream of visitors to their site.

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## KEY TERMS

**Aesthetic Effect:** Graphics and animations that are incorporated in a Council's Web site. For example, the Council's logo and movie clips.

**Biosecurity:** It is an attempt to ensure that ecologies sustaining either people or animals are maintained.

**E-Bill:** It is a secure online payment service provided on the local authority Web sites in conjunction with New Zealand Post. E-bill provides a single Web site to receive, pay and store bills from many billers, using any bank.

**E-Consultation:** An interactive facility provided by local authority Web sites to allow citizens register and communicate by e-mail with their councillors.

**E-Democracy:** An interactive facility provided on the local authority Web sites for citizens to register and vote online. It also encompasses the use of ICT and computer-mediated communication, such as the Internet, interactive broadcasting and digital telephony, to enhance political democracy or the participation of citizens (Hacker & van Dijk, 2000, p. 1).

**E-Government Strategy:** E-government is about using new technology (e.g., computers and the Internet) to improve the way central and local government deliver their services, communicate, consult, and work with others. Under this strategy, the government's aim is to create a public sector that is structured, resourced and managed to perform in a manner that meets the needs of citizens in the information age and which increasingly delivers information and services using online capabilities.

**HTML:** It is also called Hypertext Markup Language—The coded format language used for creating hypertext documents on the World Wide Web and controlling how Web pages appear.

**NZGWG:** New Zealand Government Web Guidelines—A set of guidelines and standards provided by E-government Committee of the State Services Commission to help public sectors developing their Web presence.

**Portals:** A portal is a point of entry which enables citizens to have access to a full range of services without any consciousness of movement between Internet sites and where those services may be tailored to the user's profile.

**Security Sockets Layer:** A commonly used protocol for managing the security of a message transmission on the Internet.

# E-Social Policy and E-Social Service Delivery

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## INTRODUCTION

E-social policy is an important aspect of the information society development and e-governance agenda (Fitzpatrick, 2000, 2003; Loader, 1998). To date, it has not received the same amount of critical scholarship and research activity as traditional areas of social policy, but this is changing as policy scholars focus on the whole gamut of e-governance concerns. E-social policy is concerned with the social implications of information technology communication (ITC) technology in its broadest sense. E-service delivery is a narrower term, encompassing the range of ITC used by governments, churches, charities, other non-government organisations (NGOs), and community groups to deliver social and community services online. Initially, most services provided online by governments were of a commercial and business nature (Curtin, Sommer, & Vis-Sommer, 2003), but e-service delivery has evolved quite rapidly in the fields of health, education, social security, and one-stop community information systems. It is better developed in OECD countries and in specific social policy fields (social security, housing, health, education, and community care) whereas in other countries it is very poorly developed and resourced, if it exists at all (Polikanov & Abramova, 2003). Despite this uneven development, there are many innovative examples of ITC use in farming production and trade, e-health services and promotion, education, environmental pollution management, and enhancement of development strategies in poorer nations. However, there is still a long way to go in bridging the digital divide–the unequal access to ITC of richer and poorer nations. This is a global social policy concern.

## BACKGROUND

E-social policy is a relatively new field of academic inquiry and research. Pioneer researchers in this field include Fitzpatrick (2000, 2003), Hudson (2002), and Loader (1998). In recent years, Henman [and colleagues] has made a substantial contribution to the critical analysis of e-social policy (1999, 2001a, 2001b, 2004a, 2004b, 2004c).

Fitzpatrick (2002) explains the low profile among social policy analysts. Firstly, early figures on ITC use indicated that it was dominated by the U.S. and Europe, with only 1% of the world's population using the Internet. English is the dominant language of this new technology, and few people predicted the phenomenal growth of ITC around the world. It was, therefore, seen as a marginalised issue. Secondly, social policy analysts failed to see the connections between the global communication explosion; the rapid spread of neo-liberal and public choice ideologies (Melville, 1999) that accompanied economic globalisation (Bardouille, 2001); and the radical restructuring of government and public sector activities and roles with welfare reform, especially in advanced Western post-industrial societies. Thirdly, the primary focus of social and political scientists was on the potential of *e-governance* rather than e-social welfare delivery to enhance democratic, civil rights, and political relationships (Fitzpatrick, 2000, p. 376).

More social policy scholars are turning their focus on e-social policy. The work of the Community Informatics Research and Applications Unit at Teeside University in social care and delivering community services has attracted considerable attention (Thomas & Loader, 2000). John McNutt, a U.S. academic, has played a pioneering role in e-social policy activism. McNutt has hosted an e-social policy Web site on *Yahoo!* for many years, and recently published an exemplary text in this field (Hicks & McNutt, 2002). The *Journal of Critical Social Policy*; *European Journal of Social Policy*; and the *Journal of Information, Communication, and Society* regularly feature e-social policy initiatives.

From a government perspective, the justification for using online service delivery revolves around public sector management issues, such as efficiency and effectiveness and enhanced citizen or consumer satisfaction. Governments promote the view that e-service delivery reduces costs and provides savings through better use of staff time, increased choice and freedom, and improved time management for consumers and providers. The potential of ITC technology to overcome constraints of time, travel, physical ability, age, and geographic boundaries for disadvantaged individuals and groups is very appealing to policy makers and service users alike. However, many transactions in social service fields are more complex than simple online business transactions such as downloading a form or providing information. They re-

*Table 1. Summary of key e-social policy and e-service delivery*

| Issues | Authors |
|---|---|
| Major government incentives to use e-service delivery (neo-liberal discourses that emphasise the role of individuals to manage risk, user pay [customer choice] for their social and economic needs, increased economic globalisation, restructuring of work, the welfare state, the reduced role of the state, and new public management emphasis on cost efficiency and effectiveness) | Melville (1999); Bardouille (2001); Clarke (2004); Fitzpatrick (2000); Hudson ( 2002); Hood (1995); Rhodes (1996); OECD (1998; 2003); Policity.com (2001); Commonwealth of Australia (2002); Cabinet Office-UK (2002); Perri 6 (2004); Snellen and van Donk (1998) |
| Potential of ITC to overcome social problems | Stonier (1983); Wellman, (1999; 2001); Davies (n.d.) |
| Social exclusion and digital divide—social inequality | Hudson (2002); Selwyn (2003); Kirschenbaum, & Kunamneni (2001); Perron (2004); Loader (1998a) |
| Social regulation and increased surveillance of social service beneficiaries | Henman and Dean (2004); Marston (2004); Henman (1999) |
| Technical capacity of ITC to develop complex interactive forms of service delivery and costs of infrastructure, staff time, and resources necessary for 24/7 operations | Hudson (2002); Liikanen (2003); Wittkemper and Kleindiek (2003) |
| Social nature of ITC | Fitzpatrick (2000, 2003); Loader (1998a, 1998b); Kitchen (1998); Ballamy and Taylor (1998) |
| New "virtual rights" instead of "social rights" required in an information society | Fitzpatrick (2000) |
| Inadequate skill levels, ITC infrastructure of non-government sector to deliver social services online | Wyatt and Aitken (2001) |

quire face-to-face interactions in the absence of appropriate technology to deal with multi-faceted transactions.

A key debate concerns *equity* and *access* to e-service delivery, especially among those who have traditionally been the focus of social service and development intervention; for example, the poor, the computer illiterate, the disabled, the aged, and women at both a national and global level. Perron (2004) is an excellent source on the state of ITC in developing nations. Debate about the "digital divide" (Selwyn, 2002, p. 2) and of the role of computer illiteracy in perpetuating poverty and inequality within countries and between countries are common in the literature (Perron, 2003; Norris, 2001). The available statistics on class, gender, age (International Telecommunications Union, 2004) and cross-national comparison of Internet usage (Perron, 2004) suggests that the primary beneficiaries of e-service delivery are the technologically and economically richer Western nations, especially post-industrial welfare-state societies. However, even within these societies, technology does not provide a quick fix for overcoming structural inequalities or social exclusion (Hudson, 2003). It may lead to new forms of inequality and social exclusion. What is important for social policy analysts to examine are the policies and strategies put in place by governments and transnational bodies, such as the United Nations, to reduce (and eliminate) these inequalities.

Many of the debates about the ITC (including e-social policy) are polarised. They are based on pre-existing assumptions about the social, economic, and political nature of technology in modern society. For example, there are those who argue that technology determines social behaviour and interaction, and others who argue that technology is socially shaped (Bellamy & Taylor, 1998, p. 18-19). Table 1 provides a summary of key debates.

Some writers (Bellamy & Taylor, 1998; Stonier, 1983; Wellman, 2001) hold a very utopian perspective of ITC—promoting it as possessing power to promote social change (Bellamy & Taylor, 1998; Stonier, 1983) for all, but especially those in poorer nations. The World Bank and the United Nations are strong advocates in the inherent capacity of ITC to solve their social problems. Barry Wellman is an exemplar of this position. Wellman (2001, p. 40-41) writes "the good news is that the cost of computing is becoming so low that in the developed world the digital-social class divide should get smaller just as the digital gender gap." Both Perron (2004, p. 180) and Sen (2000) argue that the falling costs of ITC (together with the scientific, political, and academic knowledge available

about it) and e-democracy potential has the capacity to address basic social problems such as HIV/AIDS, unemployment, and human rights. E-social policy is concerned with addressing poverty and unequal access to healthcare, and securing basic human rights such as employment, freedom, and well-being.

Other writers hold a more dystopian view of the control aspects of ITC (Bellamy & Taylor, 1998). Marston (2004), using a Foucaldian "governmentality" framework, argues that e-service delivery is a mechanism that increases the surveillance and governing of the unemployed and social welfare consumers (Marston, 2004). Perron (2004) focuses on the way in which ITC maintains poverty and inequality globally, and questions whether it is a "panacea for deep-seated economic deprivation or for the existence of social divisions in a capitalist [neo-liberal market] economy" (p. 197).

Other concerns relate to the social nature of the technology used in e-service provisions. On one hand, it has the capacity to provide existing and innovative forms of social services online, yet at the same time it has the potential to increase the surveillance and governing of the poor, disabled, elderly, young, and other marginal groups. It is a two-edged sword both ambiguous and contradictory in nature.

## E-SOCIAL POLICY AND E-SERVICE DELIVERY

Advents of new technology sometimes force us to develop new definitions and new typologies. As it is a relatively new field of policy analysis, defining e-social policy is not an easy task.

Fitzpatrick (2003, p. 131) writes "e-social policy is concerned with a critical examination of the social implications of these new technologies." He goes onto outline ten key areas requiring urgent attention by policy researchers:

- "The changing nature of work, employment, use of ITC in home and office—blurring of these boundaries
- Broader economic and social trends associated with ITC
- Increasing speed of communication that is changing our sense of presence and being, coupled with the dominance of English language
- The levels of e-commerce, e-business and e-shopping are still increasing–need to examine the implications of this on market and social relations
- New technologies have become the sites of both criminal activity and policing
- New forms of surveillance are emerging that involve the use of biometrics to classify and catalogue people in public and private data bases
- Rapid advances in e-health technology that is transforming the relationship between provider and consumer
- Educational pedagogies are changing through the use of ITC
- Major changes are occurring in public management that create increased tension between two conflicting needs–security and freedom
- The way in which new technologies maintain and create new forms of social exclusion" (Fitzpatrick, p.131-133)

Selwyn (2002, p. 1) claims e-social policy involves the critical examination of government rhetoric about the heroic potential of ITC to bring about "social inclusion by examining the problems that it sets out to address, the substance of these policies, and the perceived rationales and benefits for doing so." In doing so, we can assess whether ITC policies and programs promote social and economic change through social inclusion or maintains the digital divide and social exclusion. Loader (1998a) does not set out to define e-social policy, but the questions he raises about ITC fall within the traditional boundaries of social policy. Loader (1998a, p. 4) emphases "issues of social inequality, the manner in which computer-mediated communications can alter identities based around locality, gender, race, age, disability, or religious fundamentalism (Cable, 1994; Jones, 1995), and the capacity of government supranational policies to address issues of access, skills and universal carriage."

Attempts to define e-social policy raise similar issues to those in social policy. For example, we need to ask (as Titmuss (1974), a renowned social policy scholar, did) what kinds of political, moral, ethical, and ideological values are embedded in ITC. Who will benefit and who will lose out in the new cyber-landscape? Titmuss (1974, p. 4) wrote that "policy can be taken to refer to the principles that govern action directed towards given ends, and it, therefore, implies change: changing situations, systems, practices, and behaviours." Embedded in the notion of policy is the "belief that we can promote change of one sort of another" (Titmuss, 1974, p. 4-5). The goals (and outcomes) of social policy vary considerably and are highly contested. Policy goals are based on principles, such as "access, equity, egalitarianism, equality, social justice norms, needs, freedoms, rights and responsibilities" (Blakemore, 1998, p. 16-19); however, the interpretation and application of these principles are mediated by political, economic, social, cul-

*Table 2. Summary of e-service delivery application (Burrows et al., 2000; Ravi, 2000; Gaby & Henman, 2004; Marston, 2004, Hagan & Kubicek, 2000; Liikanen, 2003; Loader, Hardey, & Keeble, 2004)*

| Policy field | ITC used to deliver services | ITC used by consumers of services |
|---|---|---|
| Health | Teleradiology, teledermatology, and telepsychiatry; shared virtual reality; Internet; new networked ITCs with digital cameras, videos and scanners; email; and videoconferencing. | Internet chat rooms, email discussion lists, self-help and support news groups, narratives on personal Web sites, and newsgroups.<br><br>[Internet-based health care alternatives practitioner—providing diagnostics services and selling health products, herbs, pharmaceuticals, home care, and physical aid products]. |
| Income maintenance (social security) | Web/internet sites for information and downloading claim forms; call centres; Web kiosks; processing claim forms and payments; electronic assessment techniques; job profiling software; short messaging service (SMS); interactive voice recognition. | Community-based job Web sites, e-mail, and chat rooms. |
| Education | Enrol online; pay fees online; study subjects delivered partly or completely online; And obtain post-secondary and tertiary certificates, diplomas, and degrees online. | Internet sites for sharing educational resources, chat rooms, e-mail discussion lists, Web logs, news groups, and bulletin boards. |
| Personal and community care | Electronic service delivery systems (e.g., case management) and data transfers between statutory and non-government authorities (e.g., elderly) (County Durham Project, 2004). | Wide range of self-help and support group using newsgroups, Multi-user domains (MUDs) for survivors of abuse, chat rooms, bulletin boards, and e-mail for online social and personal support |
| Sources: (Burrows et al., 2000; Ravi, 2000; Gaby & Henman, 2004; Marston, 2004, Hagan & Kubicek, 2000; Liikanen, 2003; Loader, Hardey, & Keeble, 2004) | | |

tural, religious, historical, and ideological contexts, producing different outcomes in societies over time.

E-social policy incorporates all forms and uses of ITC for economic, social, political, cultural, and recreational purposes. It involves what Fitzpatrick (2000, p. 375) calls "cybercriticalism"—a critical analysis of the social implications of ITC, the moral and political values associated with various policy initiatives, and an assessment of the social change that accompanies it.

## E-SOCIAL SERVICE APPLICATIONS

E-social service delivery takes many forms. It is used in healthcare and telemedicine, education, organising volunteers, housing, social and community care, the provision of information on social services, and the processing and payment of social security benefits (income maintenance or social security payments). It is not possible in this brief overview to outline these in any detail. E-service delivery is defined broadly as:

> *…concerned with the delivery of public [social] services over digital networks and media—whether by government bodies or by private bodies under contracts or licence–to individual citizens and organisations.* This includes [social] services provided by NGOs, churches, charities and community groups to consumer groups (Perri, 2003, p. 16; italics added).

It is important to note that e-service delivery (except in health and education) seldom involves the *physical delivery of services*. Table 2 provides several examples of e-service delivery provided by public sector agencies.

E-health is prominent in discussions about e-service delivery (see a recent issue of the *Journal of Information, Communication, and Society*, 2004.) Ravi (2000) provides an excellent overview of new telehealth initiatives in healthcare. He notes that healthcare professionals have been using ITC "[telegraphy—signalling by wires—telephony, radio and television] to exchange e-health related information since the mid-19th century, but recent advances in new shared media [Internet and virtual reality]

[are changing the] way people relate, communicate and live" (Ravi, 2000, p. 989). Gaby and Henman (2004, p. 1-2) observe that new tensions are emerging in the traditional doctor-patient relationship as a result of better-informed health consumers (who can obtain a large volume of medical and traditional healthcare knowledge through the Internet). The increased access to health information, support groups, diagnosis, and treatments is accompanied by concern about the quality of information online. This is seen as increasing risk management for doctors and governments, who are keen to reign in the heightened power of consumers in the knowledge-diagnosis-treatment chain without relinquishing the potential benefits of e-health initiatives (Gaby & Henman, 2004).

## FUTURE TRENDS

Governments operating in an increasingly competitive and neo-liberal globalised economy (Melville, 1999) concerned about cutting costs to deliver services in a more efficient and effective manner will continue to exploit ITC. On a global scale, the challenge is to use the technology to bring about social change and improve the social and material deprivation experienced by those in poorer nations. This is a big task, as the cost of ITC infrastructure is still unaffordable for many developing countries. The number of people with access to telephones, personal computers, internet cafes, and Web kiosks in those countries is much lower than in Western countries (Perron, 2004). Social inclusion, not exclusion, needs to be at the forefront of government e-service delivery polices (Hudson, 2003). This means funding public access to computers and self-service kiosks, training and skilling people in using ITC technologies, and overcoming the cultural ambivalence towards technology by the groups it is intended to assist (Hudson, 2002). This cultural bias towards ITC is expressed differently in countries around the world. For example, Canadians have embraced e-service delivery in large numbers, whereas it is still at a low level in Britain (d'Auray, 2003). The gender and age digital divide is slowly improving in most Western nations, but the class (economic) divide is still to be overcome.

Issues of social justice, access, and equity remain core social policy concerns. Ways of reformulating the basis of entitlement and social rights in an increasingly marketized and privatized welfare state pose many challenges to policy analysts. Fitzpatrick (2000, p. 393) calls for the recognition of "virtual rights: these being rights possessed by the massless citizens which overlap with, but are nevertheless distinct from their civil, political and social rights to cater for the changes occurring in a post-capitalistic socio-economic context." The potential for ITC and e-service delivery to advance social inclusion and increased equality exists. This includes using the Internet to provide job market information for young unemployed, email discussion groups for sexual assault survivors, or telemedicine in remote or rural regions. Paradoxically, there is also potential for it to be used politically as a tool for increased surveillance and control of recipients of state and privatised social services (Hudson, 2002; Marston, 2004). As governments continue to experiment with e-democracy and e-service delivery, the need for widespread public debate within nation states and transnational policymaking organisations increases.

There will be increasing concerns about maintaining the privacy and confidentiality of citizens' data accumulated in large networked public and private organisations. This is especially so within a policy that emphasises increasingly seamless and networked integration of service provision by one-stop agencies (COA, 2002; Hudson, 2002; Wittkemper & Kleindiek, 2003) and personalised electronic portals. According to Hudson (2000), private companies are now accumulating large amounts of personal data previously collected by government agencies under competitive tendering arrangements. These companies hold considerable power over governments who have depleted their ITC expertise by contracting it out or by abolishing these positions and now rely on private firms. These changes herald a set of complex dilemmas concerning privacy, security, and the changing relationships citizens have with the state. What may emerge is a quasi-state or "digital shadows" (Hudson, 2002, p. 524) consisting of private identities based on data from private/public firms combining credit histories with benefits records to assess the likehood of social security fraud.

There are still many technological problems to be resolved before physical services are delivered online. Most e-service delivery is limited to providing information and support. Technology is being developed that has the potential to revolutionise e-service delivery. The Canadian government is leading the world in experimenting with a securely coded digital signature (known as *epass)* to enable online forms to be completed (d'Auray, 2003). We will no doubt see more interactive, multi-dimensional, and multi-user technology in e-service delivery in the future.

## CONCLUSION

The challenge for e-service delivery (and ITC generally) will be to alleviate deeply entrenched poverty and social problems in poor nations as well as rich ones. Serious global problems such as the scarcity of natural resources

and environmental degradation may force nations to develop global institutions that ensure developing nations share in the world's wealth, including new forms of ITC such as e-social policy. The capacity of e-social policy to deliver social goods and services will depend ultimately on resolving deeply held ideological divisions about the distribution and redistribution of goods and services between and within nations. These are age-old debates within the field of social policy.

Finally, e-social policy should be seen somewhere along a continuum between potential and constraints rather than a either gloom and pessimism or outright unmitigated optimism. The technology itself does not function in a deterministic manner on social beings, but instead is open to resistance and change by those who use it.

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## KEY TERMS

**Access:** A term used to describe the ability of people, more commonly those associated with welfare state provision, to secure and/or use goods and services in society. There is an assumption that access is based on a notion of getting a share of resources (not necessarily an equitable or equal one) and needs that are hard to define or measure.

**Digital Divide:** A term that capture the inequalities in access to technology between countries and, in particular, the technological divergence between richer and poorer nations.

**Egalitarianism:** According to Blakemore (1998, p. 22), this is a utopian or "ideal" goal in the pursuit of equality in society. It is based on the notion that we can find ways to ensure that all people are treated equally in every area of life—the same income levels, health outcomes, lifespan, education levels, and so forth. This will ensure the same results and outcomes in life experiences and quality of life for everyone. Inequality will disappear because there will be no differences between people.

**Equality:** In Blakemore's (1998, p. 23) typology, this term refers to equality of opportunity. To overcome inequality, unfairness, and injustice in the ways individuals and groups are treated in society, mechanisms are established to remove barriers to employment, recruitment, promotion, education, and access to welfare services and benefits. The conservative approach argues that we can never fully remove differences between people in terms of abilities and attributes. A progressive view argues that positive action or, in some cases, positive discrimination is necessary to ensure equality of opportunity.

**Equity:** A term used to describe the difference the goals of egalitarianism and equality. Equity means treating people so that we can achieve a similar end-state or outcome. An equitable approach, according to Blakemore (1998, p. 24) involves treating people fairly but not differently, so that some form of equally is achieved at the end. Some will get more than others because their needs are greater. This approach will not ensure equal outcomes for all individuals and groups as espoused by the egalitarian utopians.

**E-Social Policy:** A new term used to describe research and critical policy analysis investigating the social implications of the use of technology in social life.

**E-Service Delivery:** A term used to describe the provision of a range of social services (primarily non-physical) uses a wide variety of ITCs.

**Neo-Liberalism:** The revival of the beliefs of classical market-based liberalism. Neo-liberalism has become entwined with public choice theory. Neo-liberalism advocates the power of the market to regulate all aspects of society. Three core tenets of neo-liberalism are that markets are superior, governments have been taken over by minority interest groups, and governments do too much. The solution is to curb the power of interest groups and roll back the state by using market mechanisms.

**Social Exclusion:** A contentious and ambiguous term used by British and European policymakers to describe the complex interplay of social, political, geographic, and spatial deprivation accompanying economic and material deprivation (i.e., poverty). Many see it as a broader and more comprehensive notion (see, Selwyn, 2002).

**Social Inclusion:** A term developed to describe the advantages of access to social, political, economic, geographic and spatial resources, and goods and services in society. This includes economic and social relationships that provide support, networking, information, and other less tangible goods and exchanges that privileges those "included" in mainstream society compared to those who are "excluded" (see Selwyn, 2002).

**Social Policy:** This term describes an academic discipline and a range of social services.

**Virtual Rights:** A term coined by Fitzpatrick (2000, p. 393) to describe the "cyber rights" of massless citizens in a post-industrial social and economic context. It draws on the tri-typology of rights (civic, social, and political) originally devised by Marshall (1964).

**Welfare State:** A term used to describe the institutional arrangements that have been set up to provide state services and goods to those who cannot fend for themselves in the market economy. According to Pierson (1991), it defines: (a) a particular form of state; (b) a distinctive form of polity; or (c) a specific type of society.

# Ethical Dilemmas in Online Research

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## INTRODUCTION

Online research raises unique ethical concerns (Ess & AoIR, 2002), including the treatment and recruitment of participants, gaining consent, accessing electronic forms of data, privacy, and responsibility to the participants of online mediums (e.g., discussion lists and groups). Until the mid-1990s, very little attention was paid to ethical issues in online research for the following reasons:

- This communication medium was a very recent phenomenon (Ess & AoIR, 2002; Mann & Stewart, 2000)
- Internet research posed different ethical challenges for researchers in comparison to conventional face-to-face settings
- Existing ethical regulations and ethics review boards did not cover the new ethical issues raised by Internet research
- It was too difficult to develop a uniform code of ethical conduct for Internet research given the diverse disciplines, countries, and cultural groups using the Internet (Ess & AoIR, 2002)
- The complexity of Internet technology itself, which made adapting conventional ethical practices and processes problematic (Anders cited in Mann & Stewart, 2000; Mann & Stewart, 2000; Thomas, 1996; Whittaker, 2002)

## BACKGROUND

All researchers, including online researchers, must deal with ethical issues. Those most commonly cited include anonymity (and pseudonymity) of participants, recruitment of participants, publication of results, and balancing research benefits against harms (see Table 1). However, the ways in which online researchers handle these ethical issues are highly contested because of the unique nature of computer-mediated communication (CMC) environments and the practical difficulties of applying ethical principles in this environment (Walther, 2002). For example, who do you approach to obtain informed consent in an online political discussion list—the list moderator or each of the participants? Does it make a difference if the list is closed (moderated) or open? How do we inform participants about a research project in a multi-user domain (MUD) environment without disturbing the natural "interactions" in these forums? Is it sufficient for current ethical conventions to obtain consent via e-mail, or should

*Table 1. Summary of ethical issues in Internet research (Allen, 1996; Bassett & O'Riordan, 2002; Ess & AoIR, 2002; Herring, 1996; Jones, 1999; Mann & Stewart, 2000; Walther, 2002; White, 1996)*

| |
|---|
| The Internet provides increased research opportunities but raises new ethical issues, including:<br>• large amount of data available on Internet in a wide variety of forms (e.g., e-mail, chat rooms, instant messaging, MUDs, MOOS, USENET newsgroups), available to researchers who can access it without seeking permission or ethical clearance due to the open nature of this medium;<br>• wide variety of views on Internet research ethics based on disciplinary knowledge bases;<br>• unequal access to Internet around the globe;<br>• English is main language of Internet—limits the study of different cultures' approaches to ethical issues;<br>• different power dynamics operate in Internet research compared to conventional settings;<br>• Internet is a unique technological, cultural, and social environment that should not be subject to same ethical codes as conventional research; and<br>• need for flexible ethical guidelines that are not overly prescriptive and can accommodate the needs of different disciplines, Internet users, and cultures |

ethics committees insist on a signed hardcopy from each respondent (Mann & Stewart, 2000)? It is easy to see why some researchers are deterred by the daunting task and impracticality of applying conventional ethical procedures to CMC and developing new ethical procedures to obtain consent in this medium (Anders, 2000 cited in Mann & Stewart, 2000).

The ethical problems involved in online research are not immediately obvious to the novice or mature researcher. For example, the open and accessible nature of CMC provides researchers with the opportunity to harvest data in covert and unobtrusive ways, such as "lurking" online in discussion forums. Different countries and cultures possess a range of views and laws governing privacy, ownership, and use of electronic forms of data. In some countries with strict regulation of human research, using covert forms of data collection without informing participants is not usually approved of. This is because of increased public scrutiny of medical and social research following the abuses of World War II and, in some instances, as recently as the 1950s and 1960s (Dodds, Albury, & Thomson, 1994; Capurro & Pingel, 2002).

There is considerable variation in researchers' responses to online ethical concerns. For example, Denzin (1999, cited in Mann & Stewart, 2000) used data without following the ethical protocols of obtaining consent and informing participants that he was using the material for research purposes. In contrast, Reid (1996) went to considerable effort to obtain consent before conducting research online. A number of writers, including Boehlefeld (1996) and King (1996), warn online researchers to pay *specific* attention to ethical issues. If they do not, they run the risk of alienating the public and cutting off their supply of data and participants. Ignoring ethical issues can have a flow-on effect to other researchers (Boehlefeld, 1996). It can increase suspicion about researchers' motives and use of electronic data for research.

## DEBATES ABOUT ETHICS AND ONLINE RESEARCH

A wide range of people from different disciplines engage in Internet research, yet the social sciences and humanities have dominated debates about the role of human beings in online research. One issue that causes considerable controversy between the social sciences and the humanities is their competing views about the public/private nature of the Internet (Melville, 2004). This raises important questions about the nature of CMC, technology, and the rights and obligations of researchers and those who use the Internet. For some writers, all CMC (except for closed e-mail lists) is seen as "public space" (Paccagnella, 1997, cited in Mann & Stewart, 2000). Described as the cyberspace equivalent of a public park or street (Waskul & Douglass, 1996), they are regarded as "public," accessible, and open and available to anyone to observe and record what occurs in them (Walther, 2002). As such, individuals cannot expect privacy and confidentiality. White (2002) goes further, arguing that it is not the individual researcher's responsibility to guarantee anonymity in data collection or reporting.

If confusion, ambivalence, or ignorance exists about what is public information (and, therefore, fair game for researchers), industry professionals and moderators/controllers of public and semi-private space should correct the problem (Walther, 2002; Whittaker, 2002). Some people who are well versed in using CMC (such as activists, academics, and computer professionals) have no doubts about what they view as publicly available (Bruckman, 2002). They tend to view the majority of the Internet (apart from closed lists) as a public space. Many possess the technical skills to use software that will trawl through vast amounts of archived and current material on the Internet. If the majority of information on the Internet is seen as public documents, images, text, and language, then anyone should be able to access it without asking permission, protecting privacy and/or identity, or justifying their (research) activities and published outcomes.

Others argue that the Internet cannot be viewed simply as private or public (King, 1996; Waskul & Douglass, 1996). Waskul and Douglass (1996) argues that it has both public and private spaces. When we recognise this, we can work out what expectations people have about their postings. It is possible to work out a graduated scale at one end of which we can locate a public forum where all postings are accessible to anyone who enters the space. The expectation of those people posting and reading the material is that that material is clearly in the public arena (Walther, 2002). In contrast, for King (1996) it possible to designate those areas where all material is private and accessed by only those who have consent and permission (e.g., e-mail, listservs, some chatrooms, and bulletin boards).

The need to protect the participant's privacy and identity in an online setting is also supported by the findings that people are more likely to self-disclose personal information using CMC than they would in face-to-face situations such as focus groups and interviews (Hessler, 2003; King, 1996; Mann & Stewart, 2000). This is an interesting finding. It means that participants have different notions of their personal-self "boundaries" than was previously assumed by Internet researchers (King, 1996; Waskul & Douglass, 1996). Some participants find it helpful to disclose in what they see as a safer, more anonymous environment where they cannot be seen or heard. They also feel that the information about them

cannot be linked back to their real-world or everyday experiences and identities. Yet it is a false sense of anonymity, as we all leave physical traces of ourselves on the Internet and it is possible for people to find out the real-life identity of online participants by various technical and fraudulent means (Whittaker, 2002).

## ETHICAL GUIDELINES FOR ONLINE RESEARCH

There are three core principles that govern research in countries that signed the Helsinki Protocol governing the use of human subjects in medical research in the 1960s (Dodds, Albury, & Thomson, 1994). The three principles are confidentiality and informed consent, beneficence, and social justice (NHMRC, 1999). In some countries, ethical guidelines were developed to ensure researchers follow these principles in conducting medical and social/behavioural research. In these regulated environments, researchers need to complete ethics applications that address:

- Obtaining informed consent
- Privacy and confidentiality
- Risk assessments of the burden and benefits of the research
- Protection of vulnerable and dependent people (both over-researched and under-researched individuals and communities)
- The use of deception
- Scientific validity of their methodological design
- Cultural sensitivity
- Data storage and reporting (NHMRC, 1999)

At this stage, there are no international specific ethical research guidelines covering research using Internet technology. The response to these new ethical challenges varies from country to country. In western countries, such as the UK, the U.S., and Australia, ethics review boards and government-funding bodies are dealing with Internet ethical issues in an ad hoc and case-by-case manner, and have not formally codified them. This is because it is not possible to pre-empt the numerous ethical scenarios thrown up by this new technology (Mann & Stewart, 2000). Different approaches that are more suited to the interdisciplinary and global nature of Internet research need to be developed. Given that participants in Internet research often reside in a number of countries, researchers need to be wary of contravening the laws and cultural customs of those countries. In many countries, research participants have the right to respect and confidentiality. In practice, this means that their privacy needs to be accommodated in online research. Information privacy laws are based on the principles developed by the Organisation for Economic Cooperation and Development (OECD, 1980 cited in OECD, 2003) and set out in the Code of Fair Information Practices. As Ess et al (2002, citing http://www.privacy.org.pi) notes, "The European Data Protection Act (1995) is regarded as the most comprehensive in the world. According to this Act, data-subjects must:

- Unambiguously give consent for personal information to be gathered online
- Be given notice as to why they data is being collected about them
- Be able to correct erroneous data
- Be able to opt out of data collection
- Be protected from having data transferred to countries with less stringent privacy protection" (p. 20)

Online researchers are more than likely to be working with people living in different countries and cultures given the nature of CMC. This means that researchers need to ensure that they are not contravening the ethical and cultural practices in the treatment of participants in their research. Cultural norms and beliefs about human beings, their involvement in research, ethical theory and its application, and expectations about the rights and privacy of participants are viewed different around the world. For example, the U.S. adopts a utilitarian approach to ethics whereas Europe and other western countries, such as Australia, adopt a deontological approach (Ess & AoIR, 2002; Johnson, 2001). Cultural expectations, laws, ethical guidelines (formal or informal), and beliefs about ethics all influence what Internet researchers are allowed to do with participants, how they can be approached, what kinds of electronic data can be used, how it can be stored, and what reporting mechanisms they need to employ.

During the past decade, Internet researchers and organisations have developed ethical protocols and strategies to handle the unique ethical issues posed by Internet research. Frankel and Siang's (1999) *Report on the Ethical and Legal Aspects of Human Subjects Research on the Internet* is written for U.S. researchers. For an international and cross-disciplinary perspective, Charles Ess and the AoIR Ethics Working Party report contains a very comprehensive overview of guidelines, case studies, bibliography, and other resources on Internet ethics (2002). The Association of Internet Researchers (http://www.aoir.org) hosts a Web site containing papers covering a wide range of ethical issues from social science and humanities perspectives. Johnson's (2001) book, *Computer Ethics*, contains an excellent discussion of ethical theory and its practical application to computer programmers and other researchers. A number of profes-

sional associations, such as the computer programmers, have developed statements on ethical research (Boehlefeld, 1996). Japan, Britain, and Germany have established research institutes or groups who are involved in studying online research and ethical practices (see, Ess & AoIR, 2002).

Individual researchers are acquiring knowledge from each other in the absence of established protocols governing online research (Allen, 1996; Bassett & O'Riordan, 2002; Ess & AoIR, 2002; Herring, 1996; Jones, 1999; Mann & Stewart, 2000; Walther, 2002; White, 2002). They are developing ways to overcome obstacles presented by conventional methods of obtaining consent, recruiting participants, and assessing risk and benefits of research that are usually measured against existing ethical guidelines developed for medical and social science research (Emerton, 2003). For example, Anders (2000 cited in Mann & Stewart, 2000) outlines the problems she encountered obtaining ethics approval for an online survey of disabled academic women in a university setting. The ethics committee subsequently approved the use of an electronic signature on an e-mailed consent form rather than the traditional hardcopy version.

## FUTURE TRENDS

It is difficult to forecast the ethical challenges that will confront online researchers in the short and long term. We do know that new forms of Internet communication, such as multimedia and interactive dimensions, are proliferating. The use of online participants in "real time" research will present new ethical challenges. The Internet is not a stable medium and so there are likely to be problems with archiving research data and developing adequate retrieval systems. Internet use in Western nations such as the U.S., Canada, and Australia, and some Asian countries such as Japan and Singapore, is continuing to grow (International Telecommunications Union, 2004). As mass-communication industries are moved offshore to non-Western and developing countries (such as India, Pakistan, the Philippines, and Bangladesh) and wireless Internet communication becomes more accessible and affordable in newly industrialized and marketized nations (China, Korea, Taiwan, and India), the Asia Pacific and nations of the global south (South America), the potential number of users will be enormous.

Growth in global Internet use will be accompanied by a new wave of ethical dilemmas, more complex than those currently experienced. Cultural and linguistic issues, national disputes about ownership and regulations of data, and privacy issues will become more commonplace unless generic standards governing such issues are developed. The European Union's data protection laws are an exemplary model for other parts of the world. What is clear is that online researchers will need to adapt their research designs and ethical practices to accommodate the constantly changing modes of CMC and a more diverse and significantly larger audience.

## CONCLUSION

Ethical issues confronting online researchers range from conceptual concerns about our understanding of CMC itself to disciplinary differences in the interpretation of them. These conceptual differences have profound implications for how online researchers approach ethical concerns. Additionally, this article has raised some of the practical difficulties in the design and implementation of research studies. The nature of online research and the technology involved in it is posing some unique ethical problems. Some researchers argue that online projects should not be forced into existing codes of ethical practice, which do not take into account the unique nature of the medium. In the absence of regulatory guidelines governing ethical issues raised by online research, a collective body of knowledge gained from the experiences of individual researchers and research institutes around the world is used in the interim.

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## KEY TERMS

**Beneficence:** The expectation that a researcher will maximize the potential benefits (and minimize the harms) that can occur to participants, the research setting, and third parties not directly involved in research. Beneficence is difficult to assess since it can mean "future benefits" to groups/individuals in society and no immediate benefit to those involved in the current research project.

**Confidentiality:** The expectation that a researcher will maintain the privacy and security of data (information) provided by a participant. The researchers have the re-

sponsibility not to show any information (data) gained during the research to anyone not directly involved or given permission by the participant to access their data. It may involve giving the participants pseudonyms to disguise their real-life identity to others.

**Data:** Information (usually words, arts, artifacts, music, pictures, or text) that is used by researchers to gain an understanding of human life and interactions/actions. In online research, this includes e-mail transcripts, typed texts from MUDs or MOOs, pictures and images on Web sites, and music and audio sound.

**Deontological:** This is an ethical tradition that emphases the rights and integrity of human subjects above all other considerations, including the "greater good," public utility, or future benefits of the research.

**Ethics:** The theory and practice of the conduct and responsibilities researchers have towards participants in research, those who sponsor research, and those who are the potential beneficiaries of research.

**Informed Consent:** The mental [and physical] ability of research participants to make decisions [the voluntary agreement] to participate in research. In obtaining consent, researchers should inform participants about every aspect of the study, what is expected of the participants, the potential risks, and benefits of the proposed research, so the participants can decide whether they want to take part in it.

**Justice:** This ethical principle focuses on questions of who ought to receive the benefits of research and carry the burdens associated with it. Researchers need to recognize the potential for injustices when certain groups (low income, poor, or minority groups) are more often represented/used in research but seldom receive direct or indirect benefits arising from it.

**Online Research:** This involves the systematic collection and analysis of data about human beings, their interactions, and actions using material obtained from the Internet. It differs from face-to-face research methods as the researcher and participants seldom meet in person.

**Utilitarian:** This approach to ethics stresses the public benefit or good to come out of research, as more important than the individual rights and well-being of research participants. It is seen as a more pragmatic approach than the deontological one.

# Ethics and Privacy of Communications in the E–Polis

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## INTRODUCTION

The electronic networking of physical space promises wide-ranging advances in science, medicine, delivery of services, environmental monitoring and remediation, industrial production and the monitoring of persons and machines. It can also lead to new forms of social interaction. However, without appropriate architecture and regulatory controls, it can also subvert democratic values. Information technology is not, in fact, neutral in its values; we must be intentional about design for democracy (Pottie, 2004).

Information and communication technology (ICT) has led to the emergence of global Web societies. The subject of this article is privacy and its protection in the process of urbanization and socialization of the global digital Web society referred to as the e-polis. Privacy is a fundamental human right recognized in all major international agreements regarding human rights, such as Article 12 of the Universal Declaration of Human Rights (United Nations, 1948), and it is discussed in the article "Different Views of Privacy".

Today's computer network technologies are sociologically founded on hunter-gatherer principles. As a result, common users may be possible subjects of surveillance and sophisticated Internet-based attacks. A user may be completely unaware of such privacy breaches taking place. At the same time, ICT offers the technical possibilities of embedded privacy protection obtained by making technology trustworthy and legitimate by design. This means incorporating options for socially acceptable behavior in technical systems, and making privacy protection rights and responsibilities transparent to the user.

The ideals of democratic government must be respected and even further developed in the future e-government. Ethical questions and privacy of communications require careful analysis, as they have far-reaching consequences affecting the basic principles of e-democracy.

## VALUES OF THE E-POLIS

In our post-industrial age, we are witnessing a paradigm shift from techno-centrism to human-centrism and the emergence of an entirely new value system that holds out the prospect of a new Renaissance epoch. Arts and engineering, sciences and humanities are given a means whereby they can reach a new synthesis (Dodig-Crnkovic, 2003). This meeting of cultures is occurring to a great extent in cyberspace, making issues of cyber ethics increasingly important.

One expression of a new rising human-centrism is the emergence of e-government, which changes the citizen-government relation, making the political system transparent and more accessible to the citizen in the participatory democracy. It is, therefore, argued that a rethinking of the idea of development in the contemporary globally networked civilization is necessary (Gill, 2002). Networking at the global level must be seen in a symbiosis with local resources. Social cohesion in this context results from the ability to participate in the networked society through mutual interaction, exchange of knowledge and sharing of values. The problem of promoting e-government in developing countries via virtual communities' knowledge-management is addressed by Wagner, Cheung, Lee, and Ip (2003).

## PRIVACY MATTERS

Before the advent of ICT, communication between people was predominantly verbal and direct (Moore, 1994; Agre & Rotenberg, 1997). Today, we increasingly use computers to communicate. Mediated by a computer, information travels far and fast to a virtually unlimited number of recipients, and almost effortlessly (Weckert, 2001). This leads to new types of ethical problems, including intrusion upon privacy and personal integrity. Privacy can be seen as a protection of two kinds of basic rights:

- **Priority in Defining One's Own Identity:** (This implies the right to control the use of personal information disclosed to others, as personal information defines who you are for the others. As a special case, the freedom of anonymity can be mentioned. In certain situations we are ready to lend our personal data for statistical investigations, for research purposes and similar, under the condition that anonymity is guaranteed.)
- **The Right to Private Space:** (This is generalized to mean not only physical space but also special artifacts exclusively associated with a certain individual, such as a private diary or private letters – or disk space.) The privacy of one's home is a classic example of a private space that, moreover, is related to one's own identity. It is also an instructive archetype because it shows the nature of a private space as a social construction. You are, in general, allowed to choose whom you wish to invite to your home. However, under special circumstances, it is possible for police, for example, to enter your home without your consent, this being strictly regulated by law.

Historically, as a result of experiences within different cultures, a system of practices and customs has developed that defines what is to be considered personal and what is public (see Warren & Brandeis, 1890; Thompson, 2001). A basic distinction in human relations is, consequently, that between the private (shared with a few others) and the common (shared with wider groups) (DeCew, 2002). Fried (Rosen, 2000) claims that only closely related persons can have true knowledge of an individual.

According to Mason (2000), privacy can be studied through the relationships of four social groups (parties): (1) the individual; (2) others to whom the first party provides specific personal information for the sake of creating or sustaining a personal relationship or in return for services; (3) all other members of society who can get access to an individual's private information, but who have no professional relation to the individual and no authority to use the information; and (4) the general public who are in no direct contact with the individual's private space or information. During the interaction between parties, individuals invoke different levels of privacy. The advantages of close relationships are compared with the risks of the release of information and its inappropriate use, which could result in a loss of personal space or harm to one's identity.

## DIFFERENT VIEWS OF PRIVACY

The acquisition, storage, access to and usage of personal information is regulated and limited in most countries of the world by legislation. However, each part of the world has its own laws. In the United States (U.S.), separate laws apply to different kinds of records. Individual European countries have their own specific policies regarding what information can be collected and the detailed conditions under which this is permissible. (For an international survey of privacy laws, including country-by-country reports, see Privacy and Human Rights 2004; see also Briefing Materials on the European Union Directive on Data Protection).

The current political situation in the world and the threat of terrorist attacks has led to governmental proposals in the European Union requiring Internet Service Providers to store personal information—for example, data relating to Internet traffic, e-mails, the geographical positioning of cellular phones and similar—for a period of time longer than is required of them at present (ARTICLE 29 Data Protection Working Party).

Although relevant legislation is in effect locally, there are difficulties with respect to the global dissemination of information. To avoid conflicting situations, there is a need for international agreements and legislation governing the flow of data across national borders.

## COMPUTER ETHICS

ICT is value-laden, as is technology in general, and is changing our ways of conceptualizing and handling reality (Bynum & Rogerson, 2003; Spinello, 2003). It is not always easy to recognize intrinsic values incorporated in an advanced technology. Specialized technical knowledge is often needed for an understanding of the intrinsic functionality of a technology; for example, how information is processed in a computer network.

The need for a specific branch of ethics for computer and information systems, as compared with a straightforward application of a general ethical theory to the field of computing, is discussed by Bynum (2000), Floridi and Sanders (2002) and Johnson (2003). Tavani (2002) gives an overview of this so-called uniqueness debate. While the philosophical discussion about its nature continues, computer ethics/cyber ethics is growing in practical importance and is establishing itself as a consequence of the pressing need for the resolution of a number of acute ethical problems connected with ICT.

The changing resources and practices appearing with ICT both yield new values and require the reconsideration of those established. New moral dilemmas may also appear because of the clash between conflicting principles when brought together unexpectedly in a new context. Privacy, for example, is now recognized as requiring more attention than previously received in ethics (Moor, 1997). This is due to reconceptualization of the private and

public spheres brought about by the use of ICT, which has resulted in the recognition of inadequacies in existing moral theory about privacy. In general, computer ethics can provide guidance in the further development and modification of ethics when the existing is found to be inadequate in the light of new demands generated by new practices (Brey, 2000).

For Moor (1985), computer ethics is primarily about solving moral problems that arise because there is a lack of policy (policy vacuum) about how computer technology should be used. In such a case, the situation that generates the moral problem must first be identified, conceptually clarified and understood. On the other hand, Brey claims that a large part of work in computer ethics is about revealing the moral significance of the existing practices that seem to be morally neutral. ICT has implicit moral properties that remain unnoticed because the technology and its relation to the context of its use are not sufficiently understood. Disclosive computer ethics has been developed to demonstrate the values and norms embedded in computer systems and practices. It aims at making computer technology and its uses transparent, revealing its morally relevant features.

## FAIR INFORMATION PRACTICES

One of the fundamental questions related to the expansion of community networks is the establishment of fair information practices that enable privacy protection. At present, it is difficult to maintain privacy when communicating through computer networks, which are continually divulging information. An example of a common concern is that many companies endeavor to obtain information about the behavior of potential consumers by saving cookies on their hard disks. Other possible threats against citizens' privacy include the unlawful storage of personal data, storage of inaccurate personal data and abuse or unauthorized disclosure of such data; these are issues surrounding government-run identity databases. Especially interesting problems arise when biometrics is involved (for identity documents, such as passports/visas, identity cards, driving licenses). Remote electronic voting is dependent on the existence of a voters' database, and there are strong privacy concerns if the same database is used for other purposes, and especially if it contains biometric identifiers.

Many countries have adopted national privacy or data protection laws. Such laws may apply both to data about individuals collected by the government and to personal data in the hands of private sector businesses. The OECD has defined *fair information practices*, which include the following principles: collection limitation, data quality, purpose specification, use limitation, security, openness, individual participation and accountability (see OECD Guidelines on the Protection of Privacy).

The exceptions to these principles are possible in specific situations, such as law enforcement investigations, when it might not be appropriate to give a suspect access to the information that the police are gathering. Nonetheless, the principles of fair information practices provide a framework for privacy protection.

## LEGITIMACY BY DESIGN AND FUTURE TRUSTWORTHY COMPUTING

Legitimacy is a social concept developed during human history, meaning "socially beneficial fairness." It concerns classical social problems, such as the prisoner's dilemma and the "tragedy of the commons," in which individuals may profit at the expense of society. Social interactions without legitimacy lead society into an unsustainable state.

However, traditional mechanisms that support legitimacy, such as laws and customs, are particularly ineffective in the cyberspace of today with its flexible, dynamic character, (Whitworth & de Moor, 2003). The remedy is the incorporation of legitimacy by design into a technological system. That process begins with a legitimacy analysis that can translate legitimacy concepts, such as freedom, privacy and intellectual property into specific system design demands. At the same time, it can translate technological artifacts, such as computer programs, into statements that can be understood and discussed in terms of ethical theory.

Legitimate interaction, with its cornerstones of trustworthiness and accountability, seems a key to the future of the global information society. This implies that democratic principles must be built into the design of sociotechnical systems such as e-mail, collaborative virtual environments (CVEs), chats and bulletin boards, electronic voting systems and similar. As the first step towards that goal, the legitimacy analysis of a technological artifact (software/hardware) is suggested.

*Trust is a broad concept, and making something trustworthy requires a social infrastructure as well as solid engineering. All systems fail from time to time; the legal and commercial practices within which they're embedded can compensate for the fact that no technology will ever be perfect.* (Mundie, de Vries, Haynes, & Corwine, 2003)

In any computer-mediated communication, trust ultimately depends not on personal identification code num-

bers or IP addresses, but on relationships between people with their different roles within social groups. The trust necessary for effective democracy depends on communication, and much of the communication is based on interaction over computer networks. Trust and privacy trade-offs are normal constituents of human social, political and economic interactions, and they consequently must be incorporated in the practices of the e-polis. The bottom line is, of course, the transparency of the system and the informed consent of all parties involved.

## CONCLUSION

ICT supports and promotes the formation of new global virtual communities that are socio-technological phenomena typical of our time. In an e-democracy government, elected officials, the media, political organizations and citizens use ICT within the political and governance processes of local communities, nations and on the international stage. The ideal of e-democracy is greater and more direct citizen involvement. For the modern civilization of a global e-polis, the optimal functioning of virtual communities is vital. What are the basic principles behind successful virtual community environments? According to Whitworth, there are two such principles:

- Virtual community systems must match the processes of human-human interaction
- Rights and ownership must be clearly defined

It is technically possible for ICT to incorporate these principles, which include privacy protection via standards, open source code, government regulation, and so forth (Pottie, 2004; Tavani & Moor, 2000), including also trustworthy computing (Mundie et al., 2003).

A process of continuous interaction and dialog is necessary to achieve a socio-technological system that will guarantee the highest standards of privacy protection. Our conclusion is that trust must be established in ICT, both in the technology itself and in the way it is employed in a society.

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## KEY TERMS

**Computer Ethics:** A branch within applied ethics dealing with ethical questions concerning ICT. Computer ethics includes application of ethical theories to issues regarding the use of computer technology, together with standards of professional practice, codes of conduct, aspects of computer law and related topics.

**Cookies:** Information about a user stored by the server on the user's hard disk. Typically, a cookie records a user's preferences when using a particular site, which often happens without the user's knowledge, even though they must nominally agree to cookies being saved for them.

**CVEs:** Collaborative Virtual Environments.

**Cyber Ethics:** See computer ethics. Broadly speaking, cyber ethics deals with the conduct of individuals with respect to the information world; in the words of Moor: "the formulation and justification of policies for the ethical use of computers." Narrowly, cyber ethics refers to computer ethics discipline in cyberspace.

**Cyberspace:** A virtual space that consists of resources available through computer networks. It also refers to the culture developed by electronically connected communities. The term was first coined by William Gibson in the book *Neuromancer*.

**Design for Democracy:** The incorporation of options for socially acceptable behavior in technical systems, making the basic principles of privacy protection, rights and responsibilities transparent to the user.

**Disclosive Ethics:** A multi-level interdisciplinary approach concerned with the exposition of embedded values and norms in computer systems, applications and practices.

**Policy Vacuum:** James Moor has defined this term, meaning the absence of policies for governing conduct in new situations resulting from the use of new technologies. The central task of computer ethics is to fill the policy vacuums resulting from the use of computers by formulating guidelines for their use.

**Privacy, Right of:** The right of a person to be free from intrusion into or publicity concerning matters of a personal nature; also called right to privacy.

**Technology Legitimate by Design:** Technology designed in such a way as to promote its legitimate use and prevent its misuse.

**Uniqueness Debate:** A discussion among ethicists whether computer ethics is a unique field of ethics or merely a straightforward application of existing ethical theories to the specific technology (computers).

# Ethics of Digital Government



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## INTRODUCTION

The Internet is at once a new communications medium and a new locus for social organization on a global basis. A digital government will allow public access to government information and services, and group participation in discussions at any time and from anywhere on the globe. Digital government is regarded as the most recent development in the evolving application of electronic information technology to the performance of government. The development and migration of the technologies, as well as applications of information technology in support of government operations are other important aspects. New policies have been passed by legislative bodies to ensure the proper management and implementations of these technologies and the systems they serve, their protection from physical harm, and the security and privacy of their information. The growth of digital government has increased governments' ability to collect, store, analyze, and disclose private personal and organizational information (Fountain, 2001). In the rapidly evolving environments of digital technology, it is impossible to anticipate the leading-edge ethical issues. However, there are solid ethical imperatives to use these principles ethical behavior for resolution of the issues (Anderson, 2004). This article will focus on privacy and confidentiality of individual private information in digital environment.

## DIGITAL GOVERNMENT AND DIGITAL GOVERNANCE

Digital government and digital governance are used interchangeably. It is important to make the distinction between these two important concepts in here. Digital or e-government refers to primarily on providing information and online transaction kinds of services to citizens of government. On the other hand, e-governance focuses on public's participation and their role as citizens (Abramson & Morin 2003). Electronic governance popularly referred to as e-government is broadly defined as an application of information technology to the functioning of the government to enhance the delivery of public services to the citizens and other individual and organizational consumers of the government services (O'looney, 2002). West (2000) defines digital government as "e-government refers to the delivery of information and services online through the Internet or other digital means." For the past several years, a great deal of focus has shifted to this concept which has varying meaning and significance. Initially, the term was a little more than a general recognition of a convergence of information technology (IT) developments and application and use of these technologies by government entities. With the passage of time however, the term is being used as a reference to both current applications of IT to government operations and a goal of realizing more efficient and transparent performance of government functions. E-government involves access to government information and services 24 hours a day, seven days a week, in a way that is focused on the needs of the citizens. E-government relies heavily on the effective use of Internet and other emerging technologies to receive and deliver information and services easily, quickly, efficiently, and inexpensively.

UNESCO identifies several factors affecting the e-government and e-governance movement internationally in its e-governance study (2002): the use of information and communication technologies by citizens and non-governmental organizations to influence policymakers, transferability of information in terms of e-government reforms including draft government legislation and online services, public sector reform, and the promise of information and telecommunication technologies to increase government efficiency and effectiveness, pressure for increased accountability and transparency. In this environment of digital government, citizens can go online any time, anywhere to get information, receive services, conduct business transactions, or talk to elected representatives. The natural transparency of the online environment creates digital government that is truly of, by, and for the people. The digital government vision that guides several governments around the globe to focus commitment to digital government and reach far beyond shifting the delivery of agency services to the Internet. This vision also represents a clear and purposeful innovation that changes government culture from within, as it unfolds and demystifies bureaucracy.

## DIGITAL GOVERNMENT AND ETHICAL ISSUES

Digital government can support efficacy and accountability of government functions and services. Digital government will make transparent information about the government performance more accessible and might enhance the accountability of government to citizens (Abramson & Morin, 2003). Digital government also, because of its technological foundations, can allow public agencies to deliver "real-time" public service to citizens (Kolodney, 2004). Even though efficacy and effectiveness of digital government is so convincing, public service should be available to all citizens for digital government to be completely effective (Layne & Lee 2001). However, the universal access to public services using the Web site is still not the case for governments around the world. "Governments may want to provide Internet access through public terminals as a part of their universal [public service] access efforts (Layne & Lee, 2001, p. 134).

One of the big concerns of citizens or e-government costumers is the problem of privacy. "The technologies' surveillance capacity to collect, aggregate, analyze, and distribute personal information coupled with current business practices have left individual privacy unprotected" (Berman & Mulligan, 1999). Will the digital government be one in which individuals maintain, lose, or gain control over information about themselves? Privacy is critical because government interaction with citizens always has autonomy issues, as only government is in the business of law enforcement. Systems which design with the assumption that privacy is an issue of property or seclusion should not be adopted for use in government. "The information exchanged on many federal (government) Web sites is personal and confidential. Privacy and security policies, therefore, must be not only developed but clearly displaced as well. To fully meet users' needs, federal (government) Web sites must create protected, private, and secure spaces for the mutual exchange of information" (Stowers, 2003, p. 49).

The confidentiality and privacy of public' sensitive personal information is challenged by a legal framework that centers protections on who maintains the information, how the network is structured, where data is stored, and how long it is kept. It can be imagined that how dangerous it can get in the hands of public officials are unaware of e-government code of ethics and how to deal with sensitive public information. "As our wallets become "e-wallets" housed somewhere out on the Internet rather than in our back-pockets, and as our public institutions, businesses, and even cultural institutions find homes online, the confidentiality of our communications, papers, and information is at risk of compromise" (Berman & Mulligan, 1999).

The emergence of digital government requires public agencies and citizens as well to reflect and apply existing code of ethics and other privacy principles. This task requires significant expertise. Berman and Mulligan (1999) recommends the following:

*To function well, such an entity should have the ability to: monitor and evaluate developments in information technology with respect to their implications for personal privacy; conduct research, hold hearings, and issue reports on privacy issues in both the public and private sector; develop and recommend public policy appropriate for specific types of personal information systems; comment upon government and private sector proposals that impact on privacy; review agency activities under the Privacy Act; participate in government proposals that impact on privacy.*

Future technical advancements can provide an underlying framework for privacy and confidentiality. However, while implementing technical advancement in the realms of privacy and confidentiality code of ethics should be implemented in digital government services. Public administrators should be well equipped with information technology and code of ethical conduct for ethical decision and behavior.

One of the major issues in electronic environment of digital government is the question of access: who will have access to the information, and what kinds of information will be accessible. These questions are important because electronic sources offer tremendous economic, political, and even social advantages to people who have access to them. As the electronic resources become a larger presence in society, conflicts may arise between information "haves" and "have-nots." Conceivably, electronic communication could create greater equality by offering common access to all resources for all citizens. Internet accesses established through local libraries or other municipal or local organizations specifically for people who otherwise would have no way to use the networks, have shown that those people will, for instance, participate more in local government issues. They therefore have a greater voice in whatever happens with local government. Conversely, if access is not evenly distributed, it threatens to effect or deepen existing divides between the poor, who cannot afford expensive computer systems, and the better-off.

Questions of free speech and community standards of decency on the Internet are difficult to resolve. At present, local communities may define what is or is not obscene, and therefore not tolerated, within their geographic bor-

ders. The networks, however, have no such borders; so who defines obscenity on them has become a divisive issue. The problems will become still greater as network communication grows and crosses additional international boundaries and cultural divides.

## CODE OF ETHICS

It is generally considered best interest of every governmental agency to have a code of ethics or code of conduct. The American Society for Public Administration (ASPA) has specific guidelines for its implementation. The society makes the code of conduct available online and in print on the cover page of its major journal, Public Administration Review (PAR). The United Nations (UN) and OECD offer guideline for public agencies in developing and implementing code of ethics (Anderson, 2004). The International City/County Management Association (ICMA) provides personal and professional support for public administrators. ICMA maintains a strict professional code of conduct for public managers, and those members found violating the code of ethics are subject to private or public censure or even expulsion from membership in ICMA. The electronic government or digital government is still very young that it has not yet formed ethical standards. There are some initiatives to establish code of conduct for ethical e-government practices as well (Keegan 2000). The alliance's code of conduct has five main points:

- Adopt strict consumer-privacy policies that prohibit the improper use and resale of consumer data to third parties
- Disclose all fees and other costs associated with e-government services
- Accurately represent the number and scope of e-government products and services offered
- Accurately represent corporate structures and affiliate relationships that may affect vendor selection
- Help bridge the digital divide and ensure universal access

These and other ethics codes are open to the individual interpretations. However, these principles can be applied to the digital environment of e-government. There have been some attempts to institutionalize code of ethics for e-government. But they are in their very immature stages. These codes of ethics can provide baseline for ethical discourse in digital government era and can be applied in ethical behavior in e-government issues.

## CONCLUSION

The new developments in information technologies offer several possibilities for governments to improve the quality and efficiency of government services to their citizens. Protecting public's confidential information is especially important in the digital environment of e-government. A loss of trust in governmental agencies' ability to protect individual citizens privacy can have significant consequences in public's trust in government and their participation to e-governance.

Public agency Web sites should provide clear statements that address privacy and security issues for their users or costumers. These critical issues should be clearly stated in the policies (Atkinson & Ulevich, 2000). These legal notices are particularly important if the site is collecting any information from Web site visitors or is allowing users to pay bills or complete other transactions online. Providing privacy and protection to citizens in the digital government environment require a combination of tools—policy, technical, and ethical code of conducts. Protecting personal privacy and confidentiality, ensuring that digital government with new technology applications protects privacy, developing policies, or simply developing code of conducts will happen without collaboration of these three in e-government and e-governance.

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## KEY TERMS

**Confidential:** The classification of data of which unauthorized disclosure/use could cause serious damage to an organization or individual.

**Digital Governance:** The application of information technology to the functioning of the government to enhance the interactive delivery of public services to the citizens and other individual and organizational consumers of the government services.

**Digital Government:** The delivery of information and services online through the Internet or other digital means.

**Ethics:** Ethics is doing the right thing. It is also related to moral action and conduct; professionally right; conforming to professional standards. The field of ethics involves systematizing, defending, and recommending concepts of right and wrong behavior.

**Ethics of Digital Government:** Applications of ethical principles and use of these principles for resolution of the issues in the digital environment for government services.

**Hyper Text Markup Language (HTML):** The underlying formatting for World Wide Web documents.

**Information Technology (IT):** Acquisition, processing, storage, and dissemination of all types of information using computer technology and telecommunication systems.

**Internet:** The Internet Society defines internet as "a global network of networks enabling computers of all kinds to directly and transparently communicate and share services throughout much of the world. Because the Internet is an enormously valuable, enabling capability for so many people and organizations, it also constitutes a shared global resource of information, knowledge, and means of collaboration, and cooperation among countless diverse communities."

**Privacy:** Individual privacy and security is highly valued by our society but must be balanced by the other community enumerated values and needs. Within this understanding, the governments should assure that the privacy of such "personal property" as "written communications intended by their creator to be private including those transmitted or preserved in paper, electronic, or other media" will be protected, although it cannot be completely guaranteed.

**Sensitive Information:** Information maintained by state agencies or institutions of higher education that requires special precautions to protect it from unauthorized modification or deletion. Sensitive information may be either public or confidential. It is information that requires a higher than normal assurance of accuracy and completeness.

**World Wide Web (WWW):** The World Wide Web is made up of a collection of interconnected computers using the TCP/IP protocol language to communicate.

# E-Tourism and Digital Government



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## INTRODUCTION: TECHNOLOGICAL DEVELOPMENTS AND THE REVOLUTION OF NETWORKING

The recent developments in information communication technologies (ICTs) and the emergence of the Internet, in particular, as a mainstream communications and transaction media has changed the way that governments, organisations, and citizens interact and operate. These developments have changed the best operational and strategic practices for organisations on a global level and altered the competitiveness of enterprises and regions around the world.

The Internet enables the instant distribution of media-rich information worldwide and revolutionises the interactivity between computer users and information/service providers. The Internet therefore provides a window to the external world and facilitates the interactivity of organisations globally. Internal systems or "Intranets" have also be developed as "closed," "secured," "controlled," or "fire-walled" networks within organisations or individual departments. Intranets allow authorised personnel to access information, knowledge, and mechanisms across the enterprise to perform their tasks efficiently. Intranets enable organisations to improve their internal management at all levels by sharing media-rich data and processes, using Internet interfaces. Increasingly enterprises realise the need to formulate close partnerships with their partners and other members of the value chain for the production of goods and services. As a result, they developed "extranets," which use the same principles as well as computer equipment and networks to allow access to preselected sections of an organisation data, knowledge base, and mechanisms. User-friendly and multimedia interfaces mean that users require limited training for using the systems. Extranets can enhance the interactivity and transparency between organisations and their trusted partners, by linking and sharing data and processes through low-cost and user-friendly interfaces (Laudon & Laudon, 2004).

The digital revolution that was introduced by the Internet, intranet, and extranets provide unprecedented and unforeseen opportunities for productivity improvements, interactive management, and dynamic marketing. As a result, organisations and governments are now able to:

- accelerate knowledge and information distribution;
- apply knowledge management at the widest possible coverage;
- increase their efficiency and productivity;
- improve and shorten the decision-making process;
- enhance their communication and coordination efficiency;
- reduce their transportation, postage, and communication costs; and
- support their interactivity with all stakeholders.

To the degree that a company operates within a system of competition and dynamic developments, gaining and sustaining competitive advantage depends on understanding not only a firm's value chain but also how the firm fits in the overall value system (Porter, 1989; Porter & Millar, 1985). Porter (1985, 2001) suggests that ICTs reshape not only products, but more importantly, the nature of the competition. Entire industries are affected if ICTs have a significant role in determining relative cost position or differentiation. To gain competitive advantage over its rivals, an organisation must either perform the activities involved in adding value to a product or service at a lower cost or perform them in a way that leads to differentiation and a premium pricing (more value). Hence, ICTs change the entire economic system dramatically and organisations and governments need to constantly update their business models and enhance their competitiveness through new technological tools.

The vast majority of Northern and Western governments and organisations have already developed comprehensive representations online and have also established platforms for their internal management and collaboration with partners. Southern and Eastern societies, organisations, and governments still suffer from the digital divide, although in many places there is evidence of "frog leaping." India and China are some examples where technology is both driving and fuelling economic development.

The proliferation of broadband connections and also the availability of wireless networks through WiFi, UMTS, and Bluetooth technologies gradually propel the adoption of ambient intelligence, where technology will be forced in the background and its functionality will prevail all organisational functions and human interactions. Ambient intelligence is defined by the Information Soci-

ety Technology Advisory Group (ISTAG) (2003) as "a set of properties of an environment that we are in the process of creating." This represents a new paradigm for how people can work and live together. According to the ISTAG vision statement, humans, in an ambient intelligent environment, will be surrounded by intelligent interfaces supported by computing and networking technology that is embedded in everyday objects, such as furniture, clothes, vehicles, roads, and smart materials—even particles of decorative substances like paint. Humans will live in an ambient intelligence space in which there will be seamless interoperation between different environments—home, vehicle, public space, work, leisure space, tourism destination, and so forth. This implies a seamless environment of computing, advanced networking technology, and specific interfaces, which should be aware of the specific characteristics of human presence and personalities; adapt to the needs of users; be capable of responding intelligently to spoken or gestured indications of desire; and even result in systems that are capable of engaging in intelligent dialogue (Buhalis & O'Connor, 2005).

## BACKGROUND: GOVERNMENT AND THE TOURISM INDUSTRY

Destinations are amalgams of tourism products, facilities, and services, which compose the total tourism expertise under one brand name. Traditionally the planning, management, and coordination functions of destinations have been undertaken by either the public sector (at national, regional, or local level) or by partnerships between stakeholders of the local tourism industry. Governments therefore play an important role in tourism as they are responsible for the planning, development, promotion, and coordination of regions and places as tourism destinations. There is a wide range of additional responsibilities that governments have as a result of the tourism activity. As tourism involves cross-border activity, a great amount of political and diplomatic issues between countries arise, which need to be solved on a governmental level. Tourism is often on the forefront of economic activity, especially for peripheral and insular regions and therefore regional and national policies need to ensure maximum interaction between all different economic sectors to maximize the multiplier effects.

Tourism not only creates direct revenue to the public sector through taxation of tourism activities and products, but also contributes to the taxes paid by employees and tourism enterprises. Employment is also increased and consequently the disposable income of the host population is enhanced. In addition, the multiplier effects of the tourism activity stimulate the total output of the national economy and the boost the gross national product. Contribution to the balance of international payments is also of extreme importance to governments as it enables them to improve their international financial position. The public sector has to ensure the sustainable and dynamic development and management of the tourism industry within the borders of the economic, social, and environmental environment of the destination. In this sense, the public sector needs to manage resources, support entrepreneurial activity, control the impact of tourism on the destination, and coordinate the private sector in a way that the positive social and economic impacts exceed the negative ones, and the host population will benefit in general from the utilisation of its natural resources for tourism purposes (Buhalis, 2000; Edgell, 1990; Ritchie & Crouch, 2003; Wanhill, 2005a). Governmental intervention therefore is centred around the planning and management of the following issues:

- Planning
- Infrastructure
- Incentives
- Personnel training
- Destination marketing
- Public enterprises
- Pricing
- Industry control
- Social tourism

Wanhill (2005b, p.368) suggests that the case for public sector involvement in tourism rests on concepts of market failure, namely that those who argue for the market mechanism as the sole arbiter in the allocation of resources for tourism are ignoring the lessons of history and are grossly oversimplifying the nature of the product. Destination management organisations are often set, therefore, by the public sector to manage destinations at the national, regional, and local level and to coordinate all stakeholders toward the achievement of the strategic objectives of the region.

## E-TOURISM AND THE ROLE OF GOVERNMENTS

The ICTs' revolution has had already profound implications for the tourism sector (Buhalis, 1998, 2003). Timely and accurate information, relevant to consumers' needs is often the key to successful satisfaction of tourism demand. As few other activities require the generation, gathering, processing, application, and communication of information for operations, ICTs are pivotal for tourism. Consequently, the rapid development of both tourism supply and demand makes ICTs an imperative partner for

*Table 1. Interacting in the electronic marketplace with examples from tourism (Buhalis, 2003)*

| E-Business | Business | Consumer | Government |
|---|---|---|---|
| **Business** | **B2B** Extranets between hoteliers and tour operators | **B2C** E-commerce applications where consumers purchase air tickets | **B2G** Business interacting with government departments, e.g., hotel developer requires planning permission |
| **Consumer** | **C2B** Consumers registering their preferences on airline or hotel loyalty/executive clubs | **C2C** Consumers informing other consumers for good or bad practice (e.g., www.untied.com) | **C2G** Consumers applying for visas, requesting maps and local destination information |
| **Government** | **G2B** Government informing hotels about food safety legislation or taxation | **G2C** Government informing consumers on regulations, visa, or vaccination requirements | **G2G** Governments interacting for tourism policy makers or for asking technical assistance through organisations such as the World Tourism Organisation |

the marketing, distribution, promotion, and coordination of the tourism sector. Poon (1993) predicted that "a whole system of ICTs is being rapidly diffused throughout the tourism industry and no player will escape ICTs impacts." Information is therefore the life blood of tourism and so technology is fundamental for the ability of the industry to operate. ICTs have a dramatic impact on the travel industry because they force this sector as a whole to rethink the way in which it organises ICTs business, ICTs values or norms of behaviour, and the way in which it educates ICTs workforce (Poon, 1993; Sheldon, 1997; Werthner & Klein, 1999).

Increasingly e-commerce and the marketplace will be dominated by the interaction of business, consumers, and governments. A number of tourism examples are offered in Table 1. Not only the widely researched business-to-business (B2B) and business-to-consumer (B2C) transactions will be taking place, but the entire range of combinations between the three key stakeholders maximising their interactivity, efficiency, and effectiveness. Governments will be able to interact with businesses to coordinate destinations, to disseminate legislation, and ensure compliance to support marketing and promotion and to streamline taxation. Equally, governments already interact with consumers to provide advisories about destinations, promote destinations globally, handle complaints, and ensure that special groups such as the disabled travellers are adequately served. Finally, collaboration between public authorities and coordination with other governments will also enable a better coordination of the industry. This will lead to a better understanding of each player's needs whilst it will enhance the competitiveness of the tourism operations at the macro level.

## E-GOVERNMENT: ICTS AND DESTINATION MANAGEMENT SYSTEMS

Public tourist organisations are traditionally involved in destinations' information provision and marketing. They undertake mass media advertising; provide advisory services for consumers and the travel trade; produce and distribute brochures, leaflets, and guides both at destinations and at the places of origin of the tourists; and finally they have the strategic responsibility of the entire destination.

The Internet has revolutionised the travel industry by providing a new way for consumers to "experience" a destination, plan their itineraries, and purchase travel products. Increasingly, therefore, destination management organisations (DMOs) use ICTs in order to facilitate the tourist experience before, during, and after the visit, as well as for coordinating all partners involved in the production and delivery of tourism. Thus, not only do DMOs attempt to provide information and accept reservations for local enterprises as well as coordinate their facilities, but they also utilise ICTs to promote their tourism policy, coordinate their operational functions, increase the expenditure of tourists, and boost the multiplier effects in the local economy. Despite the fact that studies on destination-oriented systems have been traced back to as early as 1968, it was not until the early 1990s that the concept of destination management systems (DMSs) emerged. DMSs facilitate this function by administrating a wide range of requests and by providing information to an ever-increasing tourism supply in an

efficient and appropriate way. Thus, ICTs provide a way to improve the accessibility of, and the quantity and quality of, information on the destination's facilities while they present travellers with options in minimising their search costs (Sheldon, 1993). Moreover, destinations take advantage of the database marketing techniques to identify and target profitable market niches, by tailoring market-driven products for particular customers. Increasingly DMSs are employed by many national and regional governments to facilitate the management of DMOs, as well as for the coordination of the local suppliers at the destination level. DMSs are seen as particularly important significant for small and medium tourism enterprises (SMEs) which lack the capital and expertise to undertake a comprehensive marketing strategy and rely on destination authorities and intermediaries for the promotion and coordination of their products (Frew & O'Connor, 1999; WTO, 2001).

DMSs emerge as a major promotion, distribution, and operational tool for both destinations and SMTEs. They can assist developing a flexible, tailor-made, specialised, and integrated tourism product. By enabling users to search and select individual tourism products, DMSs can support travellers to create their personalised destination experience. At the organisational level, DMSs provide the essential infostructure for DMO to coordinate their activity and to provide sufficient information and direction to their overseas offices to promote the destination. DMSs emerge as interfaces between destination tourism enterprises (including principals, attractions, transportation, and intermediaries) and the external world (including tour operators, travel agencies, and ultimately, consumers). In some cases, such as in Britain, Singapore, and Austria, DMSs have been used for integrating the entire supply at the destination. Their contribution to strategic management and marketing is demonstrated by their ability to integrate all stakeholders at destinations and also to reach a global market at a fairly affordable cost. DMSs usually include a product database, a customer database, and a mechanism to connect the two. The more advanced systems tend to include a number of the additional services and features, as illustrated in the following points:

- Information search—by category, geography, keyword
- Itinerary planning for customer
- Reservations
- Customer/contact database management
- Customer relationship management functions
- Market research and analysis
- Image library and PR material for press
- Publishing to electronic and traditional channels
- Event planning and management
- Marketing optimisation and yield management
- Data editing and management
- Financial management
- Management information systems and performance evaluation
- Economic impact analysis
- Access to third-party sources, such as weather, transport timetables, travel planning, theatre, and event ticket reservations (based on WTO, 2001)

Advanced DMSs enable destinations to achieve differentiation by targeting niche markets. They also assist to improve the balance between the expectations and the perceived experiences for both tourists and locals, improving their interaction and satisfaction. In addition, DMSs assist local enterprises to increase their bargaining power over tourism intermediaries and to explore new and innovative distribution channels. The illustration of environmentally sensitive areas as well as the demonstration of sociocultural rituals can support a better understanding by locals and tourists and therefore would improve the tourism impacts in the area (Buhalis, 1997). Some governments and DMOs have benefited by implementing advanced DMSs which can rationalise destination management and marketing by supporting their promotion, distribution, and operations and also by offering innovative tools for strategic management and amelioration of tourism impacts (Buhalis & Spada, 2000; Pollock, 1998; WTO, 2001).

For example, the Australian government and the Australian Tourism Commission (ATC) launched their first consumer Web site, Australia.com, in 1996. The emphasis was on promoting Australian resources and to attract more visitors. This site contained 11,000 pages of motivational and destination content, listings of products, factual information, competitions, feedback, and a search for Aussie specialist travel agents. Then in 1998, a gateway site sitting above the global site was implemented for North America, followed soon after by several other regions. The gateways brought content from the global site to a higher level, together with links back into the global site. This enabled the regions to present content that was of more relevance to their customers at an earlier point in their browsing. Extensive consumer research was conducted to determine how potential travellers access online travel sites, their information needs, and expectations. The ATC's consumer Web site, australia.com, reflected the ever-growing importance of online technologies and confirmed the ATC's strategic move toward Web-based marketing. It targeted the international travel market and provided international visitors with instant access to motivational information aiming to influence them to choose Australia as their holiday destination. The site was based on a dynamic platform upon which the ATC used to deliver and distribute interactive, branded, and

targeted multilingual content to drive conversion of actual travel to Australia by potential travellers. In 2000/01, the site delivered 38 million pages of information to an estimated 5 million unique users. The number of users grows at a rate of more than 50% annually and by 2002/03, 12 million unique users were expected to visit the site. Hence, DMSs can provide new tools for destination marketing and promotion, as they use ICTs to disseminate information and to support a reservation function for products and facilities at specific destinations.

At the strategic level, e-tourism revolutionises all business processes—the entire value chain as well as the strategic relationships of tourism organisations with all their stakeholders including governments (Buhalis, 2003). As with other industries, ICT's penetration into tourism should provide strategic tools for the networking of the industry, for adding value to products and for enabling organisations to interact with all stakeholders in a profitable way. ICTs can improve the managerial processes in order to ameliorate control and decision-making procedures, and to support enterprises to react efficiently to environmental changes and consumer behaviour trends. Increasingly, ICTs play a critical role in customer relationship management as they enable organisations to interact with customers and continuously alter their product for meeting and exceeding customer expectations. Managing customer relationships on a continuous (365/24) and global basis is of paramount importance for the successful tourism organisation of the future. The strategic dimension gradually propels the business process reengineering of tourism businesses changing all operational and strategic processes. Innovative ICTs therefore transform the best operational practices and provide opportunities for business expansion in all geographical, marketing, and operational senses.

The Finnish Tourism Board (FTB) infostructure provides an excellent example of ICT usage for strategic purposes by the public sector as it has developed an integrated systems to support its operations. FTB aims for all its information to be accessible via Internet protocol systems for its employees (intranet), partners (extranet), and the general public (Internet). FTB has pioneered the use of the Internet for developing a network for managing tourism in Finland as well as a tool for cross industry and coordination. The system includes three systems, namely:

- **MIS:** the FTB's market information system offers a data management and distribution system. Launched in 1992 and updated in 1997, this is the internal system for FTB and is distributed to all its offices internationally. The system allows FTB staff to manage and organise sales and marketing campaigns, to coordinate their marketing and branding activities, as well as to distribute documents and administrate the tourism board globally. Access is also allowed to other professionals.
- **RELIS:** the research, library, and information service provides the backbone to the national travel research and product documentation. The service connects the travel industry to research and education organisations.
- **PROMIS:** the national database of Finnish travel products and services provides a wide range of up-to-date information on travel products, services, and contact information. External PROMIS partners provide and update data and include regional and city tourism organisations and other tourism professionals. Most of the information and images are copyright free and can be used for brochures and other promotional campaigns. The professional MIS offers a tourism database covering the whole of Finland. Hence, services for the tourist industry were improved considerably by opening an Internet connection to the PROMIS information system, which the FTB has developed together with the industry. Cooperation partners can now add and update information online. Internet service was expanded, with eight new languages being added to the site (Finnish Tourism Board, www.mek.fi; WTO, 2001).

## E-GOVERNMENTS AND DMSS CHALLENGES AND THE LIMITED DEVELOPMENT HITHERTO

Despite the fact that studies on destination-oriented systems have been traced back to as early as 1968, it was not until the late 1980s that the proliferation of DMSs has been delayed due to a number of factors and barriers to success:

- lack of adequate and affordable technology;
- lack of standardisation of the industry and the early systems;
- lack of IT expertise by tourism professionals;
- concentration of marketing efforts at the local markets;
- relatively less intensive competition;
- lack of strategic orientation;
- inability to strengthen competitiveness of the local industry;
- technology leading rather than following marketing strategies;
- less integrated approach than appropriate;
- inability to provide total services for tourism demand and supply;

- limited geographical basis which makes the system nonfeasible;
- premature innovation in a traditionally reserved industry;
- lack of standardisation and compatibility;
- withdrawal of public sector interest and funding;
- product rather than demand orientation;
- domination of small and independent tourism enterprises around the world; and
- conflicting interests of different players in the tourism industry.

A high failure rate has been observed, as several DMSs failed to attract the support and commitment required from both the private and public sectors. DMSs have also failed to develop viable products, which would be utilised from either the independent or institutional tourism demand. Two systems offer an exception to the rule, Gulliver, the Irish DMSs, and the Austrian TIScover, which now operates in a number of markets on an Application Service Provider Model. Both systems have adopted their technological basis and their ownership status and remain as the few operational and successful systems in the world.

## FUTURE TRENDS

Destinations that embrace advanced ICTs and DMSs in particular will be able to improve their strategic positioning, improve their competitiveness, and optimise their benefits from tourism. To succeed in the future, DMSs will need to combine both technological and management innovation and to develop suitable tools for satisfying the entire range of stakeholders. ICTs and DMSs in particular emerge as essential tools for both tourism demand and supply, as they establish a flexible and profitable communication bridge and a strategic management tool. They effectively provide the infostructure at the destination level and can network the entire range of principals and operators on a neural network. Eventually, DMSs will be emerging as digital business ecosystems that will enable the entire range of tourism stakeholders to plug and play, expanding the value system and developing extended networks of dynamic packaging at the destination level (Nachira, 2002, 2005; Pollock & Benjamin, 2001).

## CONCLUSION

Competent DMOs around the world gradually realise the potential opportunities emerging through ICTs and use technology in order to improve their function and performance as well as for communicating their marketing message globally. DMSs are expected to have a brighter future, provided that the industry learns several lessons from the embryonic DMSs' development experiences. They need to capitalise on expertise and knowledge generated globally and make brave steps toward the development and implementation of these systems. It gradually becomes evident that destinations that provide timely, appropriate, and accurate information to consumers and the travel trade have better chances of being selected. Only destinations that can demonstrate long-term vision, commitment, and strong strategic objectives will be able to take advantage of the emerging ICT and DMS opportunities to strengthen their competitiveness.

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## KEY TERMS

**E-Tourism:** The digitisation of the tourism iIndustry.

**DMS:** Systems that incorporate the entire range of tourism provision for a region.

**Infostructure:** All kinds of ICTs that provide the infrastructure for organisations to operate.

**Extranet:** Private network that is only accessible by trusted business partners using secured connections over on the Internet.

**Intranet:** Internal communication (LAN or WAN) network, using Internet type of interfaces accessibility only by authorised employees and protected by the company's firewall.

# E-Transformations of Societies

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## INTRODUCTION

Not all transformations of societies are caused by technology or are technology-driven. However, it is evident that technology is an important driving force of societal changes. To state that technology—both contemporarily and historically—largely shapes the form of societies does not necessarily mean the acceptance of technological determinism (as the philosophical approach). It can be viewed just as a statement concerning the hard facts.

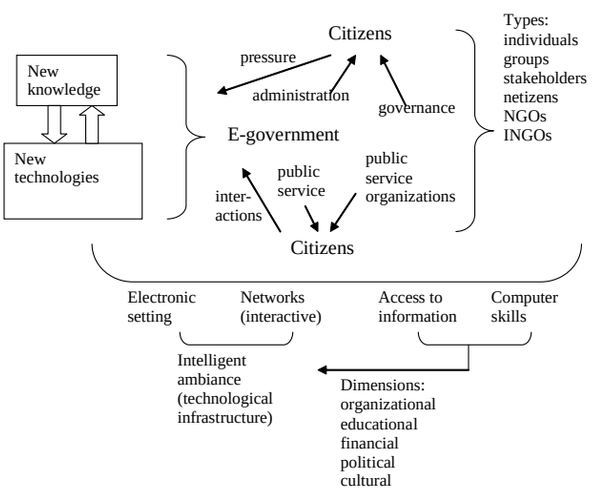
In the 20th century the rapid development of technology marked a new era. In order to describe and interpret this situation several new terms have been coined, as well as concepts and theories. Usually they underline the revolutionary character of technological change. In 1939, Bernal coined the term "scientific and technological revolution", which meant the joint effects of revolutions in science and in technology and their feedbacks. More than two decades later Kuhn (1962) developed and popularized his paradigmatic view of science and its revolutionary breakthroughs. It is needless to add that there are close—and to great extent causal—relations between science and technology.

As a result of thinking in terms of scientific and technological revolutions or paradigms there was a tendency to use them in the theory of social change. In the late 1960s and 1970s some attempts were made within the Marxist theoretical orientation (Feenberg, 1991) to create an overarching theory of scientific and technological revolution including social change (e.g., Richta—see Zacher, 1995). Western theoreticians, having more experience with high tech and its practical impacts, were describing them using somewhat different nomenclature Ackoff (1974), Brzezinski (1970), and Masuda (1981) preferred cybernetic revolution, the Age of Systems, the Information Era, the Technetronic Era, the electronics revolution (also called the microelectronics or microprocessor revolution), the computer revolution, the information revolution, and the like (Friedrichs & Schaff, 1982; Forester, 1984). With reference to science and technology such terms as *materials revolution* and *biological* (or *biotechnological*) revolution were also in use. Somewhat later a new term arrived, *Internet revolution*.

## BACKGROUND ON METHODOLIGICAL APPROACH TO E-TRANSFORMATIONAL DISCOURSE

E-transformation of anything (civilization, economy, society, government, democracy, world, etc.) refers literally to electronics as a scientific discipline, technologies, industries, and their multifaceted impacts. Thus, this reference marks out the period of time when electronics appeared, was developed and used *de facto* in all spheres and sectors of human activity and life. So electronics became the basic technology of our time. That is why it is possible to use its name as a label for a civilization, an era, a revolution, societies, a world, etc. Also, electronics can be used metaphorically as a name tag when we speak of the information sector, high tech, ICTs, media, computers, networks, future forms of societal organization or disintegration like e-herd, intelligent mobs, human swarm, human aggregations, posthuman mixed teams, and so forth. Of course, one can assume that knowledge potential-building under any form of human organization (also individual, group, societal, global) will be to a great extent electronically aided. So e-transformations should be debated in a broad context and in a broad sense. A general conceptual model is presented in Figure 1.

*Figure 1. E-transformations in the context of e-government: A conceptual model*



## Naming Civilizations and Societies

To the aforementioned terms some sociopolitical, in contrast to civilizational, dimensions were assigned. The new names characterizing the emerging nature of advanced societies were coined, for example, *cybernetic society*, *information society*, *computer society*, *telematic society*, and also *bio-society* and *bio-info-society*. It is worth adding that at the same time as some prominent authors wrote about scientific and technological civilization on information civilization, such terms as *postindustrial era* and society, *postindustrialism,* and the *Third Wave* were popularized widely by Bell (1976) and Toffler (1981, 1990, 1995).

Interestingly in the sphere of *ideology* there were some attempts in the former Communist Soviet Union and Eastern Europe to introduce such new terms as *developed socialism*, which became bankrupt in the meantime, in turn. In the West, some terms emerged like *post-capitalist society* (Drucker, 1993), and also in the longer term perspective, *posthuman society*. There were also texts on the postmarket era, on the postmaterial era, and on the postintellectual era. There were also some "end-isms", for example, Fukuyama's (1992) the *End of History*.

Of course some of these notions or concepts were merely fashionable expressions or spectacular slogans in media debates. However, in many ways their abundance reflected the actual or expected phenomena, as well as new social forms and deep transformations.

It is possible to gather the new features and differences of civilizations and societies and to relate them to the dominant type of knowledge and type of research (discipline).

*Table 1. Types of civilizations vs. types of knowledge/ research*

| Type of civilization | Main type of knowledge/research (discipline) |
|---|---|
| Technological<br>(or scientific and technological civilization) | Scientific and technological knowledge<br>Basic research<br>nuclear physics, new engineering, new materials, computer engineering |
| Post-industrialism | techno-service<br>services<br>new organization |
| Technetronic era | electronics<br>new weapons |
| Information civilization<br>(Information Era) | information theory<br>informatics<br>Web theory<br>network analysis |
| Third Wave Civilization | forecasting<br>future studies<br>foresight |
| Systems Age | systems theory<br>cybernetics<br>complexity theory |
| Computer Age | computer science<br>modeling<br>simulations |
| Postmodernism<br>(Postmodernist Era) | catastrophes theory<br>risk theory<br>chaos theory<br>chaotics analysis |
| Posthumanism<br>(Posthuman Era) | artificial intelligence<br>robotization<br>cyborgization<br>genetic engineering<br>new ethics |

This typology of civilizations or eras only considers the examples most frequently appearing in recent decades. Many names can be assigned to them like Bernal (1939), Richta (1971), Ackoff (1974), Bell (2001), Toffler (1981, 1990, 1995), Brzezinski (1970), McLuhan (1964), Dizard (1982), Castells (2001), Masuda (1981), Negroponte (1996), Dertouzos (1998), and Lyotard (1986). However our assessment is made from a current perspective and is somewhat arbitrary.

What is common or characteristic in this typology? It seems that in spite of the significant diversity of characteristic features there are rather evident references to knowledge, to its growth stimulated by scientific discoveries and new breakthrough technologies, and to new theoretical approaches (or even *Weltanschauung*) to the growing "artificialization" of man. So altogether it is the growth and accumulation of knowledge and its ever new, radical, and wide applications accompanied by progressive human inventions, skills, and competencies which count here. All this was linked, at least from a certain moment, not only to human "cognitive hunger" but also to profit making and the consumption drive. Anyway, a cybernetic model of learning could probably be the most appropriate way to reflect this situation. Of course, the prospective orientation is immanently built into the model.

Knowledge was the foundation of practically every stage or period of civilizational development. At the beginning it was nonscientific knowledge, then, scientific or science-based knowledge. Of course, its level, its growth, its ways and the methods of its "production", proportions of its types, diversity of its fields and ways and speed of its utilization and its management have impacted the pace and type of progress throughout the history of mankind.

Historically, the shaping of people's consciousness had a revolutionary character in which the role and significance of science in development, apart from such things as magic, imagination, fate, the invisible hand of the market, randomness, chaos, as well as the possibility of active building of knowledge potential were immanent and fundamental. Human proactivity in building such a potential is expressed in the creation of knowledge *per se*, in inventing new ways of doing things, in imaginatively applying it, finally, in managing it to the extent which is possible and reasonable (Halal, 1998; Hodgson, 2000). The process of knowledge potential building is performed at all levels of governance, politics, and management; and all actors, government, business, and civil society should be involved. Moreover this process is more and more transnational, international, and global. The result is global knowledge potential, unequally contributed and unequally utilized by nations. However a positive understanding of the role of science and research is not common everywhere. It is dominant in the highly advanced coun-

*Table 2. Types of contemporary societies (according to various criteria)*

| Frequently used names (with reference to the main characteristics) | O – old (past)<br>P – present<br>E – emerging<br>F – future |
|---|---|
| Traditional society | O |
| Modern society | P |
| Postindustrial society | O |
| Service society | O |
| Pre-informational society | OP |
| Information society | E |
| Cybernetic society | E |
| Computer society | E |
| High tech society | E |
| E-society | E |
| Network(ed) society | F |
| Virtual society | F |
| Bio-society | F? |
| Info-bio-society | F? |
| Posthuman society | F? |
| Mass society | P |
| Consumption society (McDonaldized) | P |
| Global society | F |
| Risk society | P |
| Mass media society | P |
| Market society | P |
| Civil society | P+F |
| Postcapitalist society | F? |
| Postmarket society | F? |
| Postmaterial society | F? |
| Transition society | P |
| Active society | P F |
| Learning society | P F |
| Educating society | P |
| Synergetic society | F |
| Sustainable society | F |
| Knowledge society | F |
| Wisdom society | F? |
| Knowledge & wisdom society | F? |
| Societal forms of the future:<br>e-herd<br>intelligent mobs<br>human aggregates<br>mixed teams (men + intelligent machines)<br>----------<br>---------- | F? |

tries. It is growing in some Asian "tigers", it is usually underestimated in the transition economies, and rather meaningless in the case of LDCs (sometimes with the exception of the military sector). Such a situation creates an even more differentiated world in spite of the possibility of creating a global knowledge society (Zacher, 2000). Technological progress alone will probably not be able to change this situation though it has given names to the present and future societies (see Table 2).

Table 2 is arbitrarily constructed. There could be no other way since the terms listed in the table were often used by their inventors as fuzzy notions, not precise or not defined. These terms are not fully comparable; some could be amalgamated; some just illustrate complementary characteristics; some are accenting just one feature which does not mean that the others are automatically excluded. Moreover several names were quite old. They were visionary; only now do they have real designates (some still do not). The assessment of what is present, emerging, or future is also arbitrary. Anyway, the list shows the intellectual efforts connected not only with research, but also documents imagination and intuition, especially in the case of the names of the societal forms emerging or predicting into the future (Bugliarello, 1997; Castells, 2001; Hiltz & Turoff, 1978; May, 2002; McLuhan, 1964; Muraszkiewicz, 2004; Rheingold, 1993, 2002).

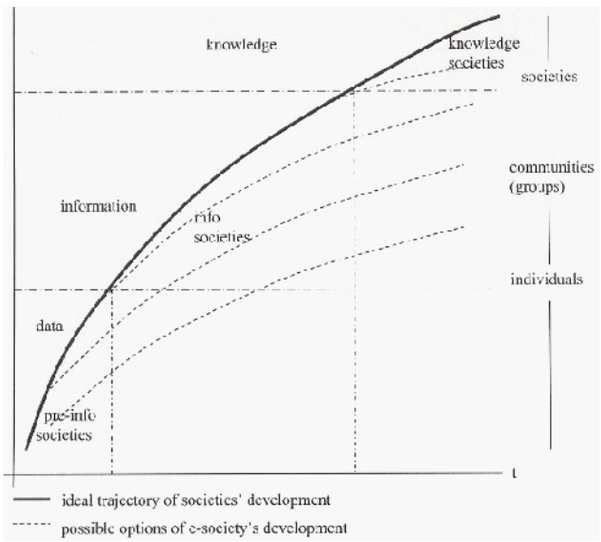
## FUTURE TRENDS:A LONG TERM VIEW

In spite of the variety of criteria determining the names of the types of societies, it seems quite evident that very often these names, directly or indirectly, refer to technology and knowledge, a type, a transforming capacity, to impacts of its applications and to the ways and methods of its production. Knowledge society is emerging as a result of the building up and accumulation of the social potential of knowledge. Of course, the growth of knowledge does not automatically generate widespread wisdom, which is obviously desirable. Moreover, the growth of knowledge alone, often treated by business as merely an information resource, can be accompanied by advances in social disintegration, exclusion, or conflicts which may negatively distort our lives and dreams. What is needed is reflexivity, a precautionary approach, learning, human-oriented axiology, trust (Zacher, 2001) and culture (Bell, 2001; Harrison & Huntington, 2000), all that can clear the way for a society of knowledge and wisdom, which is of course an ideal type. What is needed to approach this ideal is, hopefully, democracy. Democracy's possible forms should be investigated and discussed (Barney, 2000; Ester & Vinken, 2003; Katz, 1997; Keane, 2004).

In the future human relations and social life will be e-transformed. The terms used in this context are *smart machine* (Zubov, 1988), *networks* (Dertouzos, 1998; Wellman & Haythornthwaite, 2002), *being digital* (Negroponte, 1996), *digital children* (Rushkoff, 1999), and so on. There is also the very imaginative perspective of the Posthuman Era (Featherstone, 2000). How much different a techno-creature of the future will be from the traditional technological man (Ellul, 1964).

However, more long term and radical visions of social change often predict a kind of disintegrative transformation connected with many technological, socioeconomic, and political trends (like "overtechnicalization" and mass networking, McDonaldization, overindividualization, conflicting globalization, and so forth (Beck & Beck-Gernsheim, 2001; Bryman, 2004; Ritzer, 2000; Wellman, 1999, 2001).

*Figure 2. Hypothetical development of human societies and organizations: A long-term view*




The most probable future situations, which will be differentiated, are shown in Figure 2.

## CONCLUSION

Many differences in terms, definitions, ideas, and concepts of present and future organizations of humanity and its segments are due to various perceptions and interpretations of man–technology relations (Talbott, 1999; Zubov, 1988). There are at least three approaches:

- Technology meets human needs, men adapt to new technologies. Technology is just instrumental, somewhat autonomous, can be controlled a little and slightly humanized.
- Technology drives everything and predominantly determines the shape of society, economy, culture, and so forth, other factors being less influential and important. This is technological determinism based on the concepts technological fix, technological optimism, techno-culture, technocracy, for example.
- Co-evolution of man (society) and technology. This means mutual support, not determination and feedbacks; additionally, there are processes of internalization of technology (machine) in man, and sometimes human values are embedded in design of technologies. Such co-evolution will be expressed in rather consistent sociotechnological systems and objects leading to a posthuman era in which "mixed teams" may emerge as the result of artificialization of man and of human input, that is, intelligence into technology.

These three approaches are not mutually exclusive. They underline the power of technology and science, which, though not fully overwhelming, can be linked to human creativity which may contribute positively to the future course of this co-evolution.

Anyway, the further e-transformations of societies and their forms should be investigated from the point of view of changes of technology, that is, nanotechnology and bio-materials; societal developments, such as ageing, structures, and social values; and the interaction of what is technological with what is social and human. Methodologies and approaches should be systemic, holistic, complex, future-oriented, multi-, inter-, and transdisciplinary. Such theories like the chaos theory and the Web theory can be recommended as well.

It would be also worthwhile to refer to some older ideas and concepts such as social assessment of technology (Coates et al., 2000; Grin & Grunwald, 2000), appropriate technology (Schumacher, 1975), STS studies (Webster, 1991), technology-organization studies (Katsikides, 1994; Scarbrough & Corbett, 1999), high tech-high touch (Naisbitt et al., 1999), technology-environment-sustainable development (Jamison & Rohracher, 2002), and so forth. It seems that many of them can be successfully reinvented and reused. This can be done by adding some new dimensions and characteristics like informatization, networking, digitalization, globalization, and such.

A comprehensive vision of e-future ought to be completed with at least three additional—not discussed in this article—important problems: the future of capitalism, often called global, technological, information, digital (Davis et al., 1997; Hutton & Giddens, 2000; Rifkin, 2000; Schiller, 1999; Soros, 1998), the future of globalization, and the future of civilization (esp. Toffler, 1981, 1990, 1995). How to integrate all the problems mentioned into certain e-world, e-society, and e-future is the question.

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## KEY TERMS

**E-Galaxies of Knowledgeable Individuals (or Groups):** Functioning in intelligent ambiance and in the Net (traditional social links, state organizations, social structures, traditional values not as important as before but subjugated to individualism, global relations, particular goals).

**E-Transformations of Societies:** All social changes driven by electronic devices and systems used in literally all areas of human activity and life (including e-economy, e-banking, e-trade, e-media, e-government, e-learning, e-democracy, e-everything).

**Forms of Human Organizations (from the point of view of ICTs):** Pre-informational societies; information societies; and post-information societies (knowledge societies and other forms: e-herd, smart mobs, human collectivities, amalgamations and aggregations, posthuman mixed teams, and so forth).

There are many definitions—both qualitative and quantitative—and controversies on the characteristics of info and knowledge societies. What has been termed other forms of human organizations in the long term perspective do not have really good definitions. More-

over the present e-government concept may not apply to them. Their imaginative features are *de facto* explanatory and visionary, intuitive, sometimes normative. For instance, e-herd can be imagined as human herds in an electronic setting, having many contacts, no traditional (social) links, performing according to the psychology of crowd principles, and can be controlled by an e-shepherd in a manipulative and authoritarian way.

**Mixed Teams:** Made of men, also cyborgized, robots, artificial intelligence, and the like, organized to fulfill certain functions or implement certain strategies to obtain goals.

**Smart Mobs:** A form of organization of cell phone users; everybody is a broadcaster, *de facto* beyond control of any power; human crowds of such kind resemble a swarm; they can function globally, eventually heading for shared goals.

**Wisdom Society:** Can be an e-society, post-informational, knowledge-based, cognitively-oriented, also reflexive, cautious (to impacts of decisions, technologies, regulations), applying knowledge to social choices; but can be democratic (anticipatory and participatory democracy, electronically supported) or conversely autocratic (technocracy, meritocracy).

# The European Commission's E-Government Initiatives and Public Participation



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## INTRODUCTION

According to the European Commission (2003), increased networking of local, regional, and national administrations across the European Union (EU) is creating "a more integrated 'European public space' for EU citizens and businesses" (p. 6). This emerging public space owes its existence chiefly to improvements in information and communication technology (ICT). The Commission (2002) believes that e-government initiatives will help to build a more robust European public space capable of engendering in the public's mind a sense of democratic ownership of European institutions and policies: "E-government is helping to establish a more open, inclusive and productive public sector, in line with good governance" (p. 7). E-government as defined by the Commission (2005) as "the use of information and communication technologies, combined with organisational change and new skills, to improve public services, increase democratic participation and enhance public policy making."

Echoing the literature on e-democracy (Gibson, Rommele, & Ward, 2004), the Commission (2002) contends that e-government can improve EU democratic processes and public support for EU policies in two ways: by giving citizens greater access to information from authorities, which empowers citizens by improving the transparency and accountability of European institutions; and by fostering direct communication between citizens and policy makers, which enables improved mutual accommodation of needs and interests. This article analyzes Commission e-government initiatives, with special emphasis on the Consultation, the European Commission and Civil Society (CONECCS) directory, the interactive policy making (IPM) initiative, and the i2010: European Information Society 2010 initiative. IPM seeks to enable the Commission to collect feedback directly from citizens, consumers, and businesses via a single Internet access point for consultations (Your Voice in Europe). i2010 is a five-year strategy launched in 2005 to boost Europe's digital economy and includes proposals to enhance e-participation in Europe's emerging public space. Such proposals, I argue, will be more likely to succeed if the Commission were to move from managerial and consultative to participatory models of public involvement (Chadwick & May, 2003).

## BACKGROUND

Interest group involvement in shaping Commission decisions is common and largely routine. Interest group participation can make the difference between the Commission's success and failure in the policy process (Greenwood, 1997); public consultations build cooperation around and support for its proposals and policies (Bellier, 1997). Cultivating close relationships with interest groups helps the Commission gather valuable expertise, though involving a wide range of nongovernmental groups and interests in deliberations about new policy initiatives may also help the Commission avoid obstruction by national governments (Christiansen, 1996). As Schmitter (2000) notes, however, opportunities for access to European interest representation are far from equal: "While all this pluralism (to use the American expression) is entirely appropriate in a modem democracy, its highly skewed nature does raise some questions about whether these channels for the expression of particular intensities are freely and fairly available to all citizens of Europe. So far, the evidence suggests a mobilization of bias in favor of business interests" (p. 81). Also concerned about too much backroom dealing with privileged interest groups, Watson and Shackleton (2003) call for "a more open policy debate in which more voices are heard by EU policymakers" (p. 106).

The Commission is increasingly sensitive to these concerns. The Prodi Commission's 2001 *White Paper on European Governance* acknowledged the Commission's duty to broaden public involvement in its policy deliberations. From the Commission's perspective the problem was not that European citizens did not speak up, but that they often did so in ways the Commission could not easily understand or integrate into policy decisions. Europe's unruly public sphere often failed to produce the sort of policy-relevant communication the Commission saw as essential to make Brussels less remote to European citizens. ICTs took center stage in subsequent proposals to

create a "reinforced culture of consultation and dialogue" with civil society organizations (European Commission, 2002). Moving consultations online, the Commission hoped, would improve their transparency and lower barriers to access for groups new to the European policy arena. Since taking office in late 2004, the Barroso Commission has expanded on these efforts by unleashing a slew of new e-government initiatives seen as critical to reviving Europe's economy and furthering European citizenship. According to Commissioner for Information Society and Media Viviane Reding (2004), "Information technologies encourage participation, facilitate access to information and offer new ways of learning and communicating." As well as meeting public demand for participation in European policy making, the Commission views enhancing e-government and, more broadly, nurturing a European information society, as important factors in their own right in promoting economic growth across the European Union.

## THE EUROPEAN COMMISSION'S E-GOVERNMENT INITIATIVES

### Consultation, the European Commission, and Civil Society

CONECCS (Consultation, the European Commission and Civil Society) is an online directory of the Commission's formal civil society consultative bodies and of civil society organizations representing a wide range of groups and interests. CONECCS can be accessed via the Commission's civil society Web site, which provides information on the Commission's dialogue and consultations with civil society. On December 2, 2005, the directory listed 738 organizations, including "third-sector" nongovernmental organizations (NGOs) as well as business federations, labor unions, and associations of governmental authorities. Registration in CONECCS is voluntary and does not confer accreditation on groups (http://europa.eu.int/comm/civil_society/coneccs/index_en.htm). The Commission hopes CONECCS will improve the openness and accountability of its policy deliberations and decisions. The directory is part of the Commission's efforts to convey to the public what issues are being developed, what mechanisms are being used to consult, who is being consulted and why, and what has influenced decisions in the formulation of policy.

Organizations wishing to participate in Commission consultations must provide the Commission and the public at large with basic information about themselves, preferably via CONECCS. As participation in CONECCS is voluntary, however, groups may provide this information in other ways, such as "special information sheets" (European Commission, 2002). As a practical matter, though, CONECCS is fairly inclusive; organizations may be searched for alphabetically or by policy area, which provides interested citizens with a convenient means of identifying and contacting civil society organizations that participate in a wide range of EU policy consultations. Technological convenience alone, however, will not solve the underlying problem for enhancing public participation and inclusion, namely that European-level associations do not play a significant role in the lives of most Europeans. Initiatives such as CONECCS are a start, but they cannot conjure by themselves a European public space where there may not be enough European-level public engagement to begin with.

### Interactive Policy Making

The interactive policy making (IPM) initiative consists of two online instruments that enable the Commission to gather feedback directly from citizens, consumers, and businesses in order to better understand how they perceive Commission policies and to learn from their experience, with a view to shaping new policies and improving existing ones (European Commission, 2005a). Both instruments are available via the Your Voice in Europe Web portal, which was developed in the context of IPM and is the Commission's single access point for consultations.

A *feedback mechanism* helps the Commission collect information from citizens and businesses about their daily problems relating to different EU policies. About 300 intermediaries, such as Euro Info Centers and European Consumers Centers located across the EU, candidate countries, and European Free Trade Area countries, collect everyday problems and record them in the Commission's feedback database. This listening device allows for a constant monitoring of the application of existing legislation and provides concrete input for new policy initiatives. The Commission claims that thousands of cases are collected annually, providing several Directorate Generals with input for policy making (European Commission, 2005a).

An *online consultation mechanism* involves structured questionnaires, which citizens may answer on the Internet in order to provide the Commission with feedback on particular policy issues. As this mechanism can handle structured questions in several languages and deliver the output in the desired language, the Commission should be able to act on citizens' opinions and views more quickly and effectively than in the days of paper-based consultations. For example, a consultation in preparation for the Community Action Plan on Animal Welfare and Protection (closing date December 11, 2005) involved an 18-point questionnaire soliciting responses to various ani-

mal welfare topics. The survey covered key issues of animal welfare in food production, distribution, and consumption; however, there was no provision for submitting open-ended answers or for raising issues omitted from the questionnaire. By contrast, the Your Voice on eGovernment consultation (closing date December 4, 2005) did include a field for open-ended comments up to 450 characters. This implies that online tools like IPM have the technical capability to accommodate forms of public involvement that are more deliberative than filling out a questionnaire. Whether or not a given consultation solicits such contributions from the public therefore depends less on technological constraints than on practical judgments by Commission officials seeking to balance demands for participation and efficiency. Reading, sorting, and absorbing into policy initiatives contributions from the public requires time and money—resources often in short supply in busy public bureaucracies.

### i2010

i2005 is a 5-year initiative to boost the digital economy, identified by the Commission as Europe's most promising sector, accounting for 40% of EU productivity growth and 25% of EU GDP growth. The Commission (2005b) has outlined three policy priorities for i2010:

- Creating an open and competitive single market for information society and media services within the EU;
- Increasing investment in research on ICTs by 80%; and
- Promoting an inclusive European information society.

Concerning the last point—e-inclusion—the Commission is working on several proposals aimed at closing the digital divide: an Action Plan on eGovernment for citizen-centered services (2006); three "quality of life" ICT flagship initiatives (technologies for an aging society; intelligent vehicles that are smarter, safer, and cleaner, and digital libraries making multimedia and multilingual European culture available to all (2007); and actions to overcome the geographic and social "digital divide," culminating in a European initiative on e-inclusion (2008). It is noteworthy that these policy initiatives operate with a sophisticated understanding of what is causing the digital divide. The concept of a geographic digital divide refers to disadvantaged rural areas with little access to ICT. The concept of a social digital divide recognizes that access to ICT declines with socioeconomic status, but that providing for access alone does not create the means for all citizens to use ICTs competently. The Commission's e-inclusion initiatives, therefore, aim to spread the benefits of the information society to all segments of the population, including people who are disadvantaged due to limited resources or education, age, gender, or ethnicity; people with disabilities; and those living in poor areas. The Commission (2005c) has issued a Communication on eAccessibility aimed at promoting a consistent approach to e-accessibility initiatives in the member states on a voluntary basis to foster industry self-regulation. Further, EU-level information on e-inclusion and e-accessibility can be accessed via a single Web site on the Europe's Information Society Thematic Portal (http://europa.eu.int/information_society/policy/accessibility/index_en.htm). In November 2005, Commissioner Reding described the Commission's aspirations for e-government in Europe: "Full e-government means measurably more efficient, effective, inclusive and open government for all citizens and in all areas of administration and democracy. Today's online availability is just the first step."

## FROM MANAGERIAL AND CONSULTATIVE TO PARTICIPATORY MODELS OF PUBLIC INVOLVEMENT?

This section considers whether the initiatives discussed above are likely to lead to participatory forms of e-government becoming the norm. Chadwick and May (2003) differentiate between managerial, consultative, and participatory models of government-citizen interaction in e-government. At the least participatory end of their conceptual spectrum, the managerial model emphasizes using ICT to improve service delivery to citizens and businesses conceived of as "users" and "customers." The consultative model shares this basic outlook, but seeks feedback from (mainly business) interest groups to improve the technical accuracy of policies. Only the participatory model promotes democratic deliberation within civil society alongside government-citizen interactions. Each model favors its own style of information flow. Managerialism visualizes information as traveling along a one-way street from government to citizens; information under consultative auspices flows up and down a limited-access highway; the participatory model, in contrast, encourages a freewheeling, discursive flow of information: citizens to citizens, citizens to government, government to citizens (Chadwick & May, 2003). Although these models may overlap in practice, only the participatory model explicitly grants citizens a significant deliberative role in policy making; its defining logic is to politicize policy disputes through deliberation and participation. The Commission's various e-government

initiatives hailing e-participation, e-inclusion, and e-accessibility may signal some willingness to move in this direction.

Early analyses of the Prodi Commission's participatory intentions as outlined in the *White Paper on European Governance* (European Commission, 2001) were skeptical. President Prodi (2001) emphasized the need to impose order on Europe's "cacophonous" public sphere before the Commission could interact more productively with citizens. Armstrong (2002) reckoned the Commission would seek out those European civil society organizations that, in return for participation in policy making, would moderate their demands to fit the Commission's policy agenda. Warleigh (2001) was concerned that the Commission's stated preference for interacting with civil society associations organized at European level would undermine its commitment to an ostensibly broad conception of civil society because Euro-associations play such a miniscule role in Europeans' associational lives. And Magnette (2001) concluded that narrowly structured forms of engagement would dominate policy making, with policies initiated and controlled by the Commission. These assessments foresaw no radical departure from the Commission's adherence to managerial and consultative practices of public involvement wherein efficient service delivery to customers trumped efforts to facilitate meaningful participation in policymaking by citizens. During the 1990s neoliberal policy discourses in Western Europe had emphasized the role of citizens as taxpayers and customers rather than participants in politics, and e-government initiatives largely reproduced this emphasis (Chadwick & May, 2003.) Why should the European Commission prove exceptional in this regard?

Any public bureaucracy, moreover, faces trade-offs between demands for greater participation and demands for greater efficiency. The Commission is aware of this dilemma. Commissioner Reding (2005) has characterized it this way: "European citizens demand better services, better democracy. Europe's businesses demand less bureaucracy, more efficiency." The Commission's proposed solution is to frame e-government as the answer to overcoming this sort of trade-off—citizens and businesses both get what they want. This solution may fall short, however, as perfecting the technological interfaces between political institutions and the public alone cannot prevent that, when push comes to shove in pluralist systems of interest representation like the EU's, public bureaucracies often side with businesses not citizens. The defeat in 2005 of the European Constitution, however, has reminded European-level policy makers that ignoring the voices of Europe's citizens for too long does not promote European integration in the long run. The European Commission has dramatically improved both the quantity and the quality of its e-government services in the past five years. It remains to be seen whether Europe's citizens and civil society organizations seize on these opportunities with a view to steering the Commission away from old-style managerial and consultative toward new-style participatory practices and approaches.

## CONCLUSION

Present-day EU-level e-government initiatives show an awareness of social and economic barriers to e-participation, e-inclusion, and e-accessibility that is far more sophisticated than earlier e-government initiatives narrowly focused on providing information and delivering services to citizens as customers. In one sense this evolution simply reflects a growing body of experience with e-government across the European Union; there has been a steep learning curve associated with e-government everywhere. But the e-government tools being deployed by the Commission today really *are* more interactive and thus perhaps more promising than their predecessors. Deploying online technologies, however, is the easy part. A more difficult challenge for policy makers wishing to make e-government more useful to Europe's citizens will be to identify ways of creating a more meaningful European public space in which Europe's citizens feel politically and emotionally invested.

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## KEY TERMS

**CONECCS:** Consultation, the European Commission and Civil Society is the European Commission's online directory of the Commission's formal civil society consultative bodies and of civil society organizations representing a wide range of groups and interests. (http://europa.eu.int/comm/civil_society/coneccs/index_en.htm)

**E-Accessibility:** Policies to ensure that disadvantaged groups, for example, older people, people with disabilities, and people living in remote rural areas, can access the same e-government services as anyone else.

**Europe's Information Society Thematic Portal:** The EU's Web portal providing information on the EU's information society policies and activities. (http://europa.eu.int/information_society/index_en.htm)

**Interactive Policy Making:** Online forum used by the European Commission to gather feedback directly from citizens, consumers, and businesses in order to better understand how they perceive Commission policies and to learn from their experience, with a view to shaping new policies and improving existing ones. (http://europa.eu.int/yourvoice/ipm/index_en.htm)

**i2010: European Information Society 2010:** A five-year European Commission initiative to foster growth and jobs in the information society and media industries launched in 2005; includes a comprehensive strategy for modernizing and deploying all EU policy instruments to encourage the development of the digital economy: regulatory instruments, research, and partnerships with industry. (http://www.eu.int/information_society/eeurope/i2010/index_en.htm)

**White Paper on European Governance:** 2001 European Commission White Paper containing a set of recommendations on how to enhance democracy in Europe and increase the legitimacy of the institutions. (http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0428en01.pdf)

**Your Voice in Europe:** The European Commission's "single access point" to a wide variety of consultations, discussions, and other tools that enable citizens to play an active role in the European policy-making process. (http://www.eu.int/yourvoice/index_en.htm)

# European Politics of Regulating Digital Convergence

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## INTRODUCTION

The European politics of digital convergence has been an important topic for public debate since the early 1990s, when the forces of the digital revolution began to clash with the complicated system of regulation established in the "analogue age" regarding the media and communications sector.

When the Maastricht Treaty was signed in the early 1990s, the issue of communications infrastructure was incorporated into the law of the European Union (EU) for the first time in the Union's history. The Maastricht Treaty stipulates that the EU should develop a Trans-European Network of Telecommunications (TEN-Telecom), which supports network inter-connectivity and service inter-operability (Dai, 2000). The Delors White Paper on *Growth, Competitiveness, and Employment* envisions the downing of a multimedia age and calls for the creation of a "common information area" (European Commission, 1993). Shortly after the publication of the Delors White Paper, the Bangemann Report delivered a strong message to the European Council in Corfu that the EU's regulatory framework would have to be reformed in order to take on the challenges brought by new information and communications technologies (ICTs), which are generating a new industrial revolution (Bangemann et al., 1994). The release of the Delors White Paper and the Bangemann Report heralded the creation of a new policy area—the European Information Society, in which EU institutions, in particular the European Commission, have been playing a significant role up until now. Meanwhile, although the issue of regulatory challenges posed by the multimedia revolution or digital convergence was highlighted in the early 1990s by the European Commission, there was surely a lack of detailed proposal for reforming the EU's regulatory structure for ICTs.

European Regulatory reform in the information and communications technology sector gained further momentum during the second half of the 1990s. In December 1997, the European Commission published its Green Paper on convergence, which argues that "getting the regulatory framework right is of crucial importance" (European Commission, 1997, p. iv). To assist public debate, this Green Paper identifies a range of options and poses specific questions with regard to the implications of digital convergence for regulatory reform in Europe. In the 1999 Communications Review, the European Commission provides a systematic analysis about the *status quo* of regulation on the information and communications technology and suggests a comprehensive plan for the overhaul of regulatory structure.

The early years of the 21st century witnessed the official launch by the European Union of a New Regulatory Framework, drawing an end to the old regulatory structure belonging to the "analogue age." The New Regulatory Framework provides a fundamentally different package of regulation over the information and communications technology sector with a focus on the challenges posed by digital convergence.

The purpose of this article is to analyse the implications of digital convergence for regulatory and institutional changes in the European Union. Accordingly, it is the European policy and political responses to the regulatory issues raised by digital convergence that constitute the main focus for the discussions presented in this article. It is argued that, whilst major progresses have been achieved at the EU level since the 1990s in regulatory reform, there are still critical issues remaining to be resolved in relation to the regulation of digital convergence. More specifically, despite that the EU has now managed to move away from technology-specific regulation to technology-neutral regulation, the failure to establish a single European Regulatory Authority (ERA) will continue to create institutional barriers to achieving more effective and efficient regulation over digital convergence.

## BACKGROUND

The concept of digital convergence is closely related to digitisation, which is essentially a process of converting analogue forms of information (or contents) and communication into digital or binary codes (ones and zeros) that could be read and processed by computers. The fact that digitised films, television programmes, internet traffic as well as voice telephony can be transmitted over a conventional telephone line with the help of ADSL (asymmetrical

digital subscriber line) technology serves as a specific example of digital convergence.

The European Commission defines the term digital convergence in two senses: (1) the ability of different network platforms to carry essentially similar kinds of services and (2) the coming together of consumer devices such as the telephone, television and personal computer (European Commission, 1997, p. 1). In addition to these two aspects there is a third dimension to the definition of digital convergence in a European context: the emergence of a single information and communications space, in which national and institutional boundaries are not compatible with the seamless (or converged) flow of digital information and services.

The International Telecommunications Union (ITU) sees the process of convergence through digitisation as leading to the emergence of a machine language common to all in the information age: "The common language of the new Information Age is not a human language but a machine language: the zeros and ones, highs and lows, ons and offs of binary code" (1999, p. 5). Some argue that digital technologies are poised to generate revolutionary changes in social, economic, and political life of all societies across the world (Castells, 1996). Although the changes that the information and communications technology sector is going from analogue to digital are not rocket science, "they are not as widely recognised or understood" (Currie & Carter, 2004).

The link between digital convergence and regulatory reform lies in the fact "that existing rules were defined for a national, analogue and mono-media environment, but that services increasingly cut across different traditional sectors and geographical boundaries, and that they may be provided over a variety of platforms" (European Commission, 1997, p. iii). This, in the view of the European Commission, "calls into question the underlying rationale beneath regulatory approaches in the different sectors affected by convergence" (*Ibid*.). Levy (1999) argues that digital convergence undermines not only the rationale for but also the feasibility of most nationally based regulation. Martin Bangemann, former European Commissioner charged with responsibility for telecommunications and enterprise in the 1990s, argued that "the world [as well as Europe] needs to establish a new set of rules adapted to the capabilities of new technologies" (cited in Aragón, Grewlich, & Pietrantonio, 1999).

## DIGITAL CONVERGENCE AND EUROPEAN REGULATION

In order to bridge the gap between the existing regulatory structure in the EU and the digital age, the Bangemann Report identifies two directions of regulatory reform that are necessary within the EU: (1) the creation of a single regulatory framework to cover all areas of the information and communications technology sector; (2) the migration of communications regulation from the national level to the EU level (Bangemann et al., 1994). While the EU has been successful in regulatory reform along the first direction (i.e., the change from technology—specific to general issue or technology—neutral regulation), the call for the migration of regulatory authority from the member state level to the EU level has met with considerable resistance and, hence, became an aborted plan.

### A Single Regulatory Framework

Most pieces of EU Directives passed in the 1990s, as shown in Table 1, are concerned with specific areas of information and communications technologies. For example, regulation for television broadcasting standards differed from that for telecommunications; cable networks were regulated separately from satellite networks and mobile communications regulations had nothing to do with fixed line telecommunications and so forth.

The old regulatory method for electronic media and communications was basically in a response mode to technical innovations—the launch of a new platform of electronic communication would be followed by a new piece of EU legislation (or multiple pieces of legislations). Therefore, EU regulation for information and communications technologies during the era prior to the 1999 Communications Review was in most cases a step behind technical change. It is also true that, under the old regime of regulation, technical change and innovation quite often made specific regulations obsolete.

As proposed in the 1999 Communications Review, the long list of old directives would be simplified and consolidated into fewer pieces of general issue oriented regulation—with each Directive horizontally governing all technology areas.

On the basis of the European Commission's 1999 Communications Review, the European Parliament and the Council of Ministers approved the overhaul of the technology-specific regulations and introduced a new communications regulatory framework (see European Parliament and the Council of Ministers, 2002). The new communications regulatory framework, now issue-orientated, comprises five pieces of legislation (i.e., the Framework Directive, Authorisation Directive, Access Directive, Universal Service Directive, and the Directive on Privacy and Electronic Communications) (see Table 1 for details). The new communications regulatory framework represents the single most important reform within the EU

*Table 1. EU regulation: Technology-specific vs. technology-neutral*

| **Technology-specific regulation (Prior to the 1999 Review)** | **Technology-neutral regulation (New Regulatory Framework)** |
|---|---|
| • Satellite (94/46/EC)<br>• Cable (95/51/EC)<br>• Mobile (96/2/EC)<br>• Cable Ownership (99/64/EC)<br>• GSM Directive (87/372/EEC)<br>• ERMES Directive (90/544/EC)<br>• DECT Directive (91/287/EEC)<br>• S-PCS Decision (710/97/EC)<br>• UMTS Decision (128/99/EC)<br>• TV Standards Directive (95/47/EC)<br>• Voice Telephony Directive (98/10/EC)<br>• Telecoms Data Protection Directive (97/66/EC)<br>• European Emergency Number Decision (91/396/EEC)<br>• International Access Code Decision (92/264/EEC)<br>• ONP Leased Lines Directive (92/44/EEC amended by 97/51/EC)<br>• Service Directive (90/388/EEC)<br>• Full Competition (96/19/EC)<br>• ONP Framework Directive (90/387/EEC amended by 97/51/EC)<br>• Licensing Directive (97/13/EC)<br>• Interconnection Directive (97/33/EC amended by 98/61/EC) | • **Framework Directive** (Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services)<br>• **Authorisation Directive (**Directive 2002/20/EC on the authorisation of electronic communications networks and services)<br>• **Access Directive** (Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities)<br>• **Universal Service Directive** (Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services)<br>• **Directive on Privacy and Electronic Communications** (Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector) |

regarding the regulation of information and communications technologies.

The key issues on which the new communications regulatory framework is focused, such as authorisation of network and service provision, access/interconnectivity, universal service provision, and personal data and privacy protection, are common to all forms of digital communications. The identification and stipulations over these general or horizontal issues in the new regulatory framework help provide both the industry and individual consumers with a more future-proof legal environment, which is more in tune with the age of digital convergence.

## A Single Regulatory Authority?

The EU authorities, in particular the European Commission, are credited with their efforts in pushing through the adoption of the new regulatory framework, which manifests the impact of convergence in information and communications technologies. However, there are still important issues worth bearing in mind. Chiefly among others, the controversy over institutional reform to take into account the fact that digital convergence has become a community-wide phenomenon has not been resolved in a way that European policy makers initially anticipated in the early 1990s.

The initial recommendation of the Bangemann Report was "the establishment at the European level of an authority whose terms of reference will require a prompt attention" (Bangemann et al., 1994, p. 13). This "authority" has been subsequently referred to as the single European Regulatory Authority (ERA). Moreover, the Bangemann Report recommends that the single ERA will need to address "the regulation of those operations which, because of their community-wide nature, need to be addressed at the European level, such as licensing, network interconnection when and where necessary, management of shared scarce resources" (Bangemann et al., 1994, p. 13).

However, largely due to the pressure from the member state level, the European Commission decided not to pursue its original idea of establishing a single European Regulatory Authority. In the Communications Review the Commission "considers at this stage that the creation of a European Regulatory Authority would not provide sufficient added value to justify the likely cost" (European Commission, 1999). The Commission argues that "[t]he issues identified that might be better dealt with at EU level can be addressed through adaptation and improvement of existing structures" (European Commission, 1999). In view of this major policy U-turn, one can only hope that established tools, in particular competi-

tion law, at the EU level were already adequate to resolve problems associated with fragmented authority of regulation (Eurostrategies and Cullen International, 1999).

Needless to say, the rejection of the single ERA proposal was to maintain the power of regulation at the member state level through the continued existence and functioning of the National Regulatory Authorities (NRAs), which are important to the traditional notion of national sovereignty. Undoubtedly, the EU's failure to establish a single ERA will help preserve the national and institutional boundaries within a 'common information area' (European Commission, 1993), in which inter-connectivity and inter-operability are already a technological reality thanks to digital convergence.

The experience of regulatory reform in the EU suggests that the institutional setup of "the older analogue communication networks of the nation-state system" in favour of "few-to-many, space-bound, essentially hierarchical and unidirectional" (Hand & Sandywell, 2002, p. 200) types of communication are unlikely to disappear overnight. It is not surprising that there is still a long way for the EU to go before it closes the gap between the law of digital convergence and the allocation of power, which is always sensitive to the consideration of national sovereignty.

## FUTURE TRENDS

The impact of digital convergence upon information and communications regulation at the EU level is the shift of legislations from a technology-specific model to a technology-neutral model. This change in the method of regulation has so far not accompanied by a process of institutional change in terms of shifting the power of regulation from the member state level to the EU level.

Despite the drawbacks associated with the failed attempt to create a single ERA, technological convergence has already led to "institutional convergence" in relation to the regulation of electronic media and communications in some EU member states. In the UK, for example, the Ofcom (Office for Communications) was created with regulatory competence to govern the new information and communications technology sector centred on digital convergence. The Ofcom has subsumed a number of previously independent regulatory agencies, such as the Oftel (Office for Telecommunications), the ITC (Independent Television Commission) and the Radio Authority. The establishment of Ofcom is undoubtedly a positive step forward at the national level.

The political considerations that had prevented the creation of a Single European Regulatory Authority are contingent upon the extent to which European integration has been achieved. Market liberalisation has already led to the development of pan-European service providers. For example, Vodafone and T-Mobile, among others, have become truly pan-European service providers. The ever-increasing level of Europeanisation in media and communications services dictates that the power of nationally based regulatory authorities is becoming increasingly constrained. It is not unthinkable that the need for a more efficient regulatory structure might one day re-activate the debate about the case of a single ERA. To complete the process of regulatory reform in the context of digital convergence, the EU might have to move another step forward by replacing the country-specific regulatory authorities with a country-neutral regulatory authority. But this will not happy until there is a political will to do so. European policy makers are reminded that "[d]isparate national regulatory reactions carry a very real threat of fragmentation to the internal market" (Bangemann et al., 1994, p. 17).

Looking into the future of electronic media and communications regulation in Europe, two important dynamics, for example, the economic and political trend toward European integration and the technological trend towards digital convergence would seem to reinforce the idea of establishing a single European Regulatory Authority at the Union level, although this is by no means certain. In order to assess whether there is a genuine need for a single ERA, further research is needed to look into the constraints faced by the NRAs in regulating digital convergence in the European context.

## CONCLUSION

This article has explored the impact of digitisation and digital convergence upon the politics of digital media regulation in the European Union since the early 1990s. It is argued that, on the one hand, the EU has achieved remarkable success in simplifying and consolidating the regulatory structure in response to digital convergence.

The main achievement of the EU's regulatory reform thus far is the shifting away from a technology-specific approach to an issue-oriented and technology-neutral one. The new communications regulatory framework has also led to the substantial reduction in the number of directives governing the ICT sector. On the other hand, however, EU regulatory reform has stopped short of an institutional reform. In the face of opposition from the member states, the European Commission decided to abandon its earlier idea of establishing a single European Regulatory Authority. This has left the National Regulatory Authorities in charge of each national market for the information and communications technology sector. There

seems to be a rational and technological justification for the establishment of a single ERA, but the complexity of EU politics does not provide an easy answer as regard to whether this will happen in the future.

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## KEY TERMS

**Assymetrical Digital Subscriber Line (ADSL):** Instead of making the existing copper wire telephone lines obsolete in the digital age, asymmetrical digital subscriber line (ADSL), as a digital technique, enables a conventional telecommunications network to transmit multimedia services including such as voice telephony, internet access and video-on-demand *via* the same telephone network.

**Digital Convergence:** Thanks to the process of digitisation, traditionally different forms of communication services, such as voice telephony, data, sound, or pictures, can be transmitted over many different networks. Digital convergence is also manifested in the design of new generations of digital products, which are often multi-functional devices.

**Digitisation:** Digitisation is essentially a process of converting analogue forms of information (or contents) and communication into digital or binary codes (ones and zeros) that could be manipulated by computers.

**European Regulatory Authority (ERA):** The idea of establishing a single European Regulatory Authority (ERA) was initially put forward in the Bangemann Report in 1994 in response to the development of the information society in general and digital media convergence in particular. The European Commission subsequently gave up the idea for an ERA in its 1999 Communications Review due to pressure from the member states.

**Information and Communications Technologies (ICTs):** Information and communications technologies (ICTs) is a generic term referring to any kind of digital media and communication technologies and networks.

**National Regulatory Authority (NRA):** A National Regulatory Authority (NRA) is a national regulatory agency responsible for regulating either the overall information and communications technology (ICT) sector or a specialised domain of the ICT sector. The Ofcom, for instance, is a National Regulatory Authority in the UK charged with the responsibility of regulating the overall ICT sector.

**TEN-Telecom:** Trans-European Network of Telecommunications (TEN-Telecom) is one of the three TENs (Trans-European Networks) stipulated in the Maastricht Treaty that the European Union shall promote. The other two TENs are the Trans-European Network of Energy and Trans-European Network of Transport.

**Video-on-Demand (VoD):** Video-on-Demand (VoD) is an individiualised service provided mostly by traditional telecommunications companies offering digitised films and television programmes through a telephone line. In the UK, the law does not allow a telecommunications company to provide television broadcasting service but VoD service is legal.

# The EU's Use of the Internet

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## INTRODUCTION

The European Union (EU) has been one of the leading lights concerning Internet use in dealing with other public administrations and citizens. This article will argue that e-government has meant that the European Commission has been able to promote a virtual arena for pan-European activity, which has promoted action at the national and local levels in the EU.

In the first instance, this article will deal with how the European Commission uses the Internet to attempt to improve its own relationship with both national public administrations and citizens in terms of the European policy-making process. Although the Internet is perceived as aiding public administrations in information and service provision, which helps to deliver better governance from an institutional governance perspective, a focus on this would only tell one half of the story. Increasing democratic participation and regaining trust in the political system at large is also an important issue for public bodies such as the European Commission to address, and this is not merely a technical process. These technical (efficiency, etc.) and democratic stages are two key parts in the process of developing an information and communication technology (ICT)-based governance agenda in the EU.

In order to outline the process, this article deals with four different aspects of the European Commission's e-policies. It makes reference to the following:

1. The Commission's information provision, through the EU's Europa (II) Web server;
2. The way in which the Commission has tried to interact with citizens, using interactive policy making (IPM);
3. The e Commission initiative; and
4. The way in which the Commission links member-state public administrations together, through the IDA(BC) programme.

This article reveals the increasing coherence of the European Commission's approach to using the Internet in institutional affairs. Although the Commission's approach to using the Internet for governance was initially unstable and ad hoc, by the turn of the century, all efforts had converged around the political issues of institutional reform and better governance. This has been further enhanced by the application of the open method of coordination as one of the tools of EU governance, which has enabled the Commission to take a more informal role in implementing e-government strategies at the pan-European level.

This article does not attempt to define e-government at the European level nor does it go into policy areas concerning e-government (such as research, socioeconomic inclusion, improving competitiveness, or specific e-government policy developed by the European Commission), but will contribute to a greater understanding of how the EU itself has used the Internet to promote an e-government agenda that is affecting all public administrations.

## BACKGROUND

Digital technologies, as exemplified by the Internet—simply a network of digital data networks—are redefining the landscape upon which actors play their roles in most economic, social, and political spheres. Communication channels such as the Internet provide for dissemination of information and knowledge, thereby enabling innovation to take place over networks as most innovation is now non-physical. According to David Johnston (1998), "we are moving to a society in which the management of information—through communications and computer networks—is becoming the key strategic resource that determines the competitiveness of nations and communities."

Johnson and Post (1998) question "whether a governance system divided into territories demarcated by physical boundaries can simultaneously serve the two key governmental goals of legitimacy and efficiency." Raising the question leads to the conclusion that new actors such as the EU, which is geographically broad, are introduced into the governance matrix. Economic efficiency becomes far more important than geography, and when combined with a high level of institutional legitimacy, new governance paradigms can emerge. ICTs have been perceived as opportunities to improve both efficiency and public value. The EU emerges as one of those actors that can be

seen to develop its legitimacy and efficiency through the use of the Internet.

From this perspective, the EU is provided with a whole range of opportunities concerning its use of the Internet. These opportunities, however, can also be considered as challenges for the structure of the EU and its components. The following five sections outline how the European Commission deals with these challenges and opportunities.

## TOOLS FOR IMPLEMENTING AN E-GOVERNMENT AGENDA IN THE EU

### Information: Europa and Europa II

At the EU level, where much is made of the role of the "information deficit" as a central problem that subsequently causes the perceived democratic deficit, much use can be derived from this characteristic of the Internet to promote an enhanced standing of the EU. At a basic level, this is carried out by the development of a Web site that contains information (European Commission, 2004). In more advanced stages, this involves the creation of databases that can be used by individuals and organisations to find out more information about a particular issue. The first step was undertaken by the European Commission in 1995, with the development of the Europa Web site.

From the perspective of the European Commission, the target audience of its communication strategy has always been a concern: the typical user has been defined by European political priorities, such as catering for people on the move. The provision of information for the average citizen was not made a priority, which reveals a certain approach toward the person on the street, whom it is considered would not be interested in the EU's institutions. This position has evolved since 1995.

*Table 1. Pace setters in the European Commission for Web-based activity (European Commission, Informatics Directorate, 2001)*

| |
|---|
| **Thematic Portals** |
| Information Society |
| Environment |
| Research |
| The EU in the World |
| **Audience-Based Portals** |
| Virtual Press Office |
| Dialogue With Citizens |
| Dialogue With Business and Business Networks |
| **Service-Based Portals** |
| EU Law |
| EU Administrations |
| Statistics |
| Publications |
| Libraries |
| *Recruitment* |

The Europa Web site and the .eu.int domain are the central point of reference for all the EU's institutions: sites that predated Europa were gradually brought into this domain in order to present a coherent approach to the Commission's (and the Union's) digital presence. Cordis (Community Research and Development Information Service) and ISPO (Information Society Promotion Office) were the two big sites that had been created outside the .eu.int domain (www.cordis.lu and www.ispo.cec.be, respectively). The site can be divided into subdomains: there are about 140 important subsites under the common denominator europa.eu.int. Europa is managed and maintained by a staff of 90 people: 30 are in the Commission, and the remainder are provided by a contracted company. This team of 90 staff also work on SCADplus, which provides information leaflets regarding EU activity areas and policies. The staff of 90 does not include those working in other directorate generals (DGs) on content for the various sites of each DG in the European Commission. Other EU institutions make use of the Commission's Europa site too. When Europa was launched by the Commission, other EU institutions subsequently asked the Commission to coordinate the entire EU's Web presence.

Europa II is based on a set of thematic, audience-based, and service-based portals and provides information, allows interactive communication, and provides transaction opportunities for citizens and businesses (European Commission, Informatics Direct, 2001, pp. 7-9). Plans to create thematic portals for various areas, including the Information Society, were elaborated in 2001.

Table 1 shows which sites had already been put in place by 2001, which the Commission considered pace setters for other Web-based activity. Each activity is the responsibility of a different DG, and some are worked on by several DGs in collaboration.

The portal sites are generally decided upon by all the EU institutions, with the Commission making a proposal and the Council agreeing, although sometimes, the Council requests that the Commission investigates possibilities for portals. Given the levels of integration that is required for these portals, both horizontally and vertically, it is necessary to have the support of all levels of public administration—national and European—in their creation. EURES—a European CV-hosting portal, for example, is supported by the IDA programme.

DG Press, which holds the chair for meetings of the Europa II Steering Committee, works together with 10 other services in the Commission that are considered to have "crucial responsibility in the field of web communication and information" (European Commission, Information and Communication Support, 2001, p. 19). Because responsibility for each DG's Web site is left to the respective DG, a forum has been created to ensure that all Web pages are compliant with common rules (European Com-

mission, Information and Communication Support, 2001, p. 20). This forum also operated in the framework of the original Europa site. Although this can be seen as an internal issue, the fact that separate DGs are responsible for their own window to citizens is revealing as again it shows the decentralised policy of the European Commission toward information production (even more so when one realises that many Web sites with content provided by the Commission are actually managed outside of the EU's institutions).

DG Press initiated the process for developing a plan for an information and communication strategy from 2005 onward around the end of 2003. This has resulted most recently in publication of a communication entitled *An Action Plan to Improve Communicating Europe by the European Commission*. It is hoped that by this time, the EU's communication tools (which include television, Internet, and printed publications) will be in all the official languages of the EU. From this strategic perspective, the Web services provided by the Commission are seen as the one area where citizens would turn to after having first seen information on television, or in a newspaper, for example. Plan D, for Democracy, Dialogue, and Debate, which has emerged since the establishment of the new Barroso Commission, is described in the following section as it attempts to interact with citizens as well as providing information.

Besides the advantages for use of the Internet for publishing information regarding the EU, the World Wide Web (WWW) and other Internet-based information dissemination tools have recently been seen as increasingly crucial to the Commission. It is very difficult for European institutions to deal with national media as these are often not altogether objective regarding the EU. A well-defined Internet presence, it is assumed, will provide citizens with relevant and accurate information regarding the EU and its various institutions. However, the Commission had not given the area much priority in its day-to-day business until Europa II became an active component of Commission reform.

The provision of data on the EU by the Commission and other institutions provides an example of the top-down approach to using the Internet to enhance transparency and openness. However, transparency and openness must have a purpose: just as with the establishment of a Web site, there must be an area in which openness and transparency can have an impact upon politics and policy making in the EU. This is perhaps most clearly seen through interaction with the grassroots of society. This bottom-up approach would also see governments providing public spaces for individuals to interact, not necessarily with intervention from politicians and other public servants (Coleman, 2001, p. 121). A good example of application of networked technologies to dissemination of political discourse would be the Belgian Government's (who held presidency of the European Council in the second half of 2001) Expedition Europe Web site (http://www.expeditioneurope.be). This, in contrast to the Futurum Web site (http://europa.eu.int/futurum), was specifically targeted toward 17- to 25-year-olds living in the European Union. Although the subject matter was similar to Futurum, the approach was different, attempting to encourage a different sector of society to become involved in the debate on the EU. This is an example of providing multiple information channels, an activity made much easier by the Internet. The ability to use different channels to enable full dissemination of information to various groups of actors in society will also allow interested persons to provide commentary on issues of interest to their interest groups through debates. This links information provision with interaction. Yet again, although the technology provides assistance, the drive must come from civil servants and politicians to ensure that information is readily available and relevant, and from citizens to ensure that the agora is used.

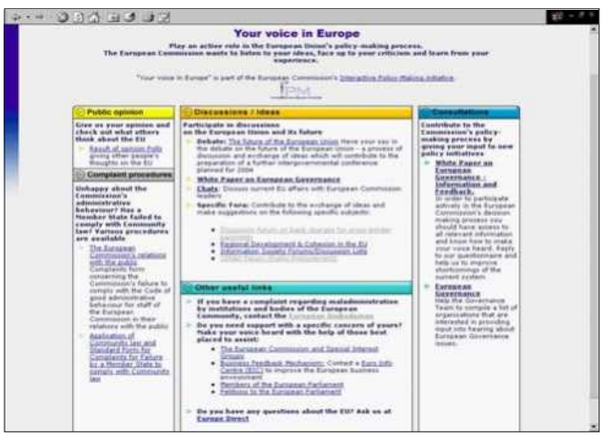
## Connecting with Civil Society: CONECCS

One of the few possibilities that the European Commission itself has for exercise of the bottom-up approach to information provision is provided by the CONECCS initiative.

The Commission, as a coordinator in EU governance, must provide as many opportunities as possible to ensure all parties participate in useful and timely dialogue: in 2000, the European Commission placed its CONECCS database online. CONECCS can be found in the Commission's pages on Civil Society. It contains two elements: one is to improve transparency and the other is to improve the consultation process: both are central to the better governance ambitions of the European Commission.

The use of the database, however, is limited to information provision despite having many other potential uses in policy making. By using the database for information provision alone, the Commission is not taking advantage of the possibilities for greater interaction with a range of actors. But there is a second motivation in using the Internet as the basis for an open repository of names in the field: it enables individuals and organisations to get involved in the major players in the consultation process, rather than voicing their opinion to the Commission directly. Here, the Commission is not wishing to interact directly with individuals, but rather providing a list of intermediaries who can communicate with the Commission. This would reduce the opportunities for information overload in the Commission itself, and en-

*Figure 1. The Your Voice in Europe portal (http://europa.eu.int/yourvoice)*




sures that filtering of opinion takes place prior to contact with the Commission.

## Interaction: Your Voice in Europe, IPM, and Plan D

Provision of information is one side of the coin for the e-governance agenda in the Commission. The ability for citizens and businesses to search for information is a crucial element of building better governance in the European institutions. However, the ability of citizens to interact with Commission officials and policy is also of major importance. The first step is to provide information about how citizens and interest groups can get involved in the policy-making process: CONECCS goes some way in this direction. Your Voice in Europe presents the pinnacle of this approach to opening up the EU's institutions in terms of ICT usage. It was an initiative established in the framework of the Interactive Policy Making initiative (described later in this article), and was intended to work toward the objectives in both the governance and reform programmes of the European Commission.

Your Voice in Europe is, essentially, a portal that shows citizens how they can interact with various EU institutions. From the home page of the subsite (http://europa.eu.int/yourvoice), one can participate in consultations, enter various discussion fora, or provide feedback to the EU institutions on different issues (complaints to the ombudsman, etc.). Your Voice in Europe attempts to bring together various activities that were being undertaken in the Commission. It has also added and improved various tools used by the Commission in the consultation process, one of which—IPM—will be described later. A screenshot of the initial page is shown in Figure 1.

At this European Commission level, interaction can be broken into two distinct dimensions, which are defined by the structure of the political institutions. In the first, the European Commission is an organisation dependent upon external advice for proposal of legislation; it is also dependent upon external support for implementation of legislation. This requires that the Commission be as responsive as possible to external requirements and actions. Generally, this relates to issues of a highly technical nature, and as such necessitates interactivity between Commission officials and experts. The second dimension recognises the fact that the European Commission is supposedly a guardian of the Treaties of European Union, and is entrusted with ensuring that these treaties are abided by in more general terms. Whilst this notion of interaction is treated seriously by the Commission, and is a clear application of the transparency principle, there is a distinction between these two levels of consultation: on specific legislation and on general topics of interest. Your Voice in Europe attempts to marry both dimensions together, by providing information about how to contact the EU ombudsman, as well as providing the gateway to specific consultations.

The target audience is more likely to be individual citizens and the site is designed with this in mind: it shows individuals the number of different ways they can interact with the European Commission. As well as providing citizens with information about how they can interact with the EU institutions, the European Commission is also carrying out activities that involve direct interaction through use of the Internet; this is known as the IPM initiative. The notion of interactive feedback again highlights one of the central characteristics of the Internet, which has been promoted through the e-government agenda. Encouraging debate at the grassroots level and providing information are seen as necessary requirements toward a Europe based upon a new form of governance: However, these actions only provide partial solutions. When debates are centred upon specific issues, the actors involved at policy level must be willing and able to provide responses to interested bodies. There must be a purpose in activity from the citizen; he or she must feel that his or her voice is being acted upon (Coleman, 2001). Interaction through consultation must take place. Similarly, when information is provided, public administrations and governments must be able to provide response to further questions that emerge. Given the complexity of much of this information, they must also be able to provide this information easily: this often requires human interaction.

Thus, it can be seen that responsiveness to requests for information is more than simply providing the ability to post an e-mail to a standard mailbox, to which a response may or may not be given. To take advantage of the technology, human interaction is required and there is no

simple technological fix for this. The consultation procedure becomes increasingly important in this respect as it provides the opportunity for many aspects of better governance to be exercised. In the case of the European Commission, which forms the focus of this chapter, responsiveness to interested parties in policy development is also important: this is done with citizens and businesses through the various consultation procedures.

Consultation on proposals is one of the standard activities of the European Commission. The Commission's Secretariat-General has a unit that deals with the Commission's relationship with Civil Society, and it is here where the consultation procedures are centrally managed (although consultation itself is the responsibility of individual DGs). This unit was responsible for outlining the minimum standards for consultation, which were published (after much internal consultation) in a communication at the end of 2002 (European Commission, 2002). In this document, the role of the Commission in the field of consultation was further emphasised: "Wide consultation is not a new phenomenon. In fact, the Commission has a long tradition of consulting interested parties from outside when formulating its policies. It incorporates external consultation into the development of almost all its policy areas" (European Commission, 2002, p. 3).

Commission activity on consultation is linked to both administrative reform and EU governance. Again, Internet-based tools are simply tools: they are implemented toward an aim of facilitating an improvement in governance processes. However, the Commission has a long way to go in furthering the use of these tools. Another consideration that must be examined concerns the users of these tools: who will use them, and why will they do so?

In contrast to the expert-type opinions requested by the European Commission in the CONECCS consultation process described above, Your Voice in Europe provides a more flexible framework for consultation. The central piece of the Your Voice in Europe initiative is the IPM tool, developed by the Commission.

The mandate for the IPM tool was set out in 2000: it was to use the Internet in involving more stakeholders in the policy-making process. The IPM tool allows for interested individuals to be consulted in a structured manner and fully caters for the multilingual dimension of the EU. This overcomes one of the problems facing consultation prior to the development of the tool: when too many responses to consultations were received, the Commission always had a problem of dealing with the information.

The IPM tool has been supported by most DGs and other Commission services, and will be taken as the primary manner for execution of most public (and restricted) consultations. In consideration of its ability to provide real-time analysis to policy makers, its ability to consult citizens, businesses, and civil society groups in any of the official languages (along with scalability for new languages), its flexibility (consultations can either be open to the public or closed to a predetermined group), the Commission is keen to encourage this tool to show how citizens can get involved in consultations which help inform policy making, creating better regulation and showing citizens that their input is considered important (i.e., better governance).

Crucial to the operation of this tool has been the increased use of the Internet: it has been used as the gateway to the Your Voice in Europe portal. The coupling of databases and interactive forms, which are filled in online, has enabled the Commission to create a system of interaction with interested parties from all areas of the EU (and beyond) to contribute to consultations. The practical problems of receiving comments on consultations prior to the development of such a system have been avoided by the development of a tool that poses structured questions, rather than requesting general feedback on long documents, which few people would read.

In a couple of unpublicised consultations carried out in the pilot phase of the Your Voice consultation portal, between 100 and 200 replies were received per consultation; this was still more than the average consultation carried out using traditional means. In July 2002, a consultation on Data Protection issues was launched publicly; within 10 days, 7,500 replies were received. The total figure for that consultation later finished as 9,500. A list of consultations that took place between 2001 and 2003 are in provided in Table 2.

As well as open and closed consultations using the IPM tool, DG Internal Market has also established a so-called feedback mechanism, which aims to get spontane-

*Table 2. Consultations using the IPM tool between 2001 and 2003*

| Date | Subject | Number of responses |
|---|---|---|
| June 2001 | • Modernizing the Internal Market for industrial goods | 253 |
| September 2001 | • Governance | 224 |
| December 2001 | • Review of the New Approach | 135 |
| January 2002 | • Trust barriers for business-to-business e-marketplaces | 103 (limited to certain organizations) |
| April 2002 | • Pan-European government e-services | 67 |
| June 2002 | • Data protection | 9,500 |
| July 2002 | • Cybersquatting | 1,137 |
| September 2002 | • Undertakings for collective investment in transferable securities | Closed |
| October 2002 | • Pack sizes in the EU | 691 |
| December 2002 | • Animal protection during transport | 4,141 |
| January 2003 | • Give us your opinion on Your Voice in Europe | Ongoing |
| February 2003 | • European Action Plan for organic food and farming | 1,136 |
| June 2003 | • Draft Chemicals Legislation | Closed |
| September 2003 | • Legal problems in e-business | 651 |
| November 2003 | • Public procurement | Closed |

ous feedback on specific European policy issues. It is part of the IPM initiative, and was established as a pilot project in April 2000 for use by 41 Euro Info Centres. Since that time, it has grown: between October 2001 and June 2002 the initiative grew to include around 300 citizen and business contact points that included Euro Info Centres, European Consumer Centres, and the Citizens Signpost Service (http://europa.eu.int/yourvoice/ipm/index_en.htm). These organizations are contracted by the European Commission to enter issues that are raised with them into an online database which is then referred to by each DG when designing new legislation or reviewing existing legislation. The whole database was operating for DGs Internal Market and Enterprise, and would be available to all DGs by the beginning of 2003. More recent evaluation has been carried out on the feedback mechanism which has questioned the utility of this mechanism, and in particular the use made of such a tool by policy makers (European Evaluation Consortium, 2005). Once again, this shows that perceived benefits of e-government are not necessarily converted into material or social value without a greater understanding of how policy-making processes must evolve to take this into consideration.

"Plan D," released by the new vice president of the European Commission, responsible for Institutional Relations and Communication, is an attempt to link together the idea of Communicating Europe with providing spaces for dialogue and debate. The Internet is seen as an area where such a set of debates can take place. Despite this fact, the Futurum Web site, established to discuss the Future of the European Union, was closed after the European Convention for the European Constitution. However, Vice President Wallstrom has opened up her own blog (http://weblog.jrc.cec.eu.int/page/wallstrom), where debate can take place.

## Institutional Impact: Toward an E-Commission

Reform of the Commission is central in driving the vision toward an e-commission, as has been the case with many public administrations, for example, the United States (Fountain, 2001). Studying the emergence of an e-commission, and the use made of the "e" in e-government by the European Commission provides us with a dynamic and interesting case. Also, examining the way in which the European Commission has started to govern in the wake of the communications revolution provides us with a greater insight into the development of EU governance, and provides the Commission with a tool that has the opportunity to create a European public space and develop a greater role for the European Commission in the daily lives of European citizens.

The Commission has clearly defined areas of concern in public administration at the EU level that need to be rectified in order for the institutions of the EU to (re)gain public confidence. In fact, since 1995 the European Commission has consistently mentioned reform of the institution in its annual work programs (1995, 1996, 1997b, 1998). More specifically, the Commission's White Paper on Reform stated that "[Administrative reform] is thus a political project of central importance for the European Union" (2000a). Part II of the White Paper was more explicit in the role of the Internet, proposing a set of action points "towards the e-Commission" (2000b, pp. 8-10). Building upon the eEurope Action Plan (1999), the Commission states "Technological development holds out the potential of modernizing the administration and improving its communication and working methods both internally and with its partner organisations and interlocutors" (2000b). This again seems to emphasize the role that the Internet plays in enforcing current structures and institutions in the EU. Furthermore, the Commission sees the development of its e-strategy as something that helps promote business: "easy access to public sector statistics and data and electronic public procurement can also give a strong stimulus for new private sector value-added services" (2000b, p. 8). This strategy, it believes, is something that should be applied to itself as well as other institutions in the EU.

Reform of the Commission is limited to boundaries cast in the Treaties on European Union, which are inevitably slow (and perhaps even unwilling) to react to institutional demands (from the Commission) for greater democratic accountability for the Commission, along with all the side effects that would emerge from this including a greater role in governance of the EU. Therefore, as in eEurope, the Commission has found ways to work within these boundaries.

The Informatics Directorate of the European Commission splits the role of the e-Commission into three different strands. These are as follows: "internal administration," "efficient communication with external partners," and "public service to citizens and business" (European Commission, Informatics Directorate, 2001, p. 9). The e-Commission is at the core of all ICT-based reform and better governance initiatives in the European Commission. Europa II is considered to be the main digital interface between citizens, businesses, and interest groups; IPM is supposedly one of the central ways of managing the policy-making process. The latter strand has provided the focus above, and now the first two are described in detail.

Internal discussion takes place not only around the issues concerning internal administration. Although the Commission's official Web site, Europa, is designed for its audience, the process behind developing the site and

*Table 3. Projects financed during the first phase of IDA (European Commission, 1997a)*

| Sector | Project |
|---|---|
| **Customs and taxation** | VIES/ Sites |
| | Excises Control |
| | Quota |
| | Scent-CIS/Fiscal |
| | Taric |
| | EBTI |
| | Transit |
| **Fisheries** | FIDES |
| **Agriculture** | Animo |
| | Physan |
| | Shift |
| **Social Security** | TESS (formerly Sosenet) |
| | EURES |
| **Public Procurement** | SIMAP |
| **Health** | EUPHIN (formerly CARE) |
| | EUDRA (pharmacovigilance) |
| | REITOX |
| **Statistics** | SISR/DSIS |
| | Extracom |
| | SERT |
| **Commercial Policy** | SIGL |
| **Competition Policy** | Fourcom |
| **Culture** | ITCG (Illegal Traffic of Cultural Goods) |

its follow-up, Europa II, has been part of the internal development of the Commission into an "e-aware" organization.

In the new Barroso Commission, Informatics has moved to the status of Directorate General, giving higher political priority to the Commission's own public administration reform through use of ICTs. The recent communication to the Commission outlining a proposed strategy for the e-Commission (2006-2010) asserts, "the Commission needs to apply to its own administration the European information society policy in the eGovernment field" (European Commission, 2005c, p. 5).

The previous three sections show that the European Commission has tried to bring policy making closer to external partners, citizens, and businesses despite recognizing that the distance between these actors is problematic. Because of this, the opportunity to interact with citizens directly through technology such as the Internet has been welcomed, and the Commission itself is trying to find ways to facilitate the development and use of networks internally, as well as in its relations with external partners.

## Implementing E-Government Across Europe: IDA(BC)

One of the central activities in this sphere of communicating with external partners is the relationship between the Commission and public administrations in the member states. The Commission is responsible for the management and day-to-day running of the Interchange of Data Between Administrations (IDA) program. IDA has a clear legal basis within the treaties on European Union, and as such, was given a clear mandate. This has now become part of the Commission's e-government goal, which is now focused upon coordination and not government in the traditional sense.

The system connects national administrations' computer networks together through the EuroDomain, a private network based on Internet technology. National entry points are supplied by the Trans-European Services for Telematics Between Administrations (TESTA) project, which is part of IDA. The Commission provides support for several types of projects through this service, to which member states are required to connect as a result of European legislation (Council and European Parliament, 1999). The consequences of this, however, are not seen as creating a nascent European Information System, but just enabling national governments to coordinate information and communication in common areas. The focus was to encourage interaction between the Commission and member states, and between the various member states. It was originally established to make exchange of information in the SEM easier to carry out.

In the latter stages, content became the driving issue. Pharmaceutical information is one area where the initiative has already been successful. A complete list is provided in Table 3.

The IDA program was subsequently adopted as part of the e-Europe initiative in e-government, after the Swedish Government hosted a meeting on the subject during its presidency of the European Council.

As a result of IDA and IDA II, a large amount of data communications between the EU institutions and member states pass over the Internet. Closely related to the development of the IDA program is the creation of an intranet for various committees dealing with EU policy areas. Named the Communication and Resource Centre for Administrations (CIRCA), this intranet is a place for papers, agendas, and discussion to ameliorate the policy-making process by the European Commission. Access is granted depending upon the status of the committee; some are completely closed and others are open. This harmonized Web-based application should overcome some of the problems experienced by policy networks in making policy; the technological network approach (Winn, 1998) described in an earlier section of this article is in evidence here.

IDABC, the successor to the previous IDA programs, continues along the lines set by its predecessors. However, this time, as well as supporting public administrations, the EU's institutions have decided to include Businesses and Citizens as end users. The decision to include these elements in the Interoperable Delivery of Pan-European eGovernment services is, however, more than

just a continuation of existing policy. It outlines the formation of a new set of services to be carried out in a pan-European fashion. The consequences of this development are potentially far reaching in terms of changing patterns of governance within Europe's borders.

## FUTURE TRENDS

Trends in the four areas described above are also reflected in the development and maturity of the e-government phenomenon in general. Internet sites are not just developed for the sake of it, but are designed with specific tasks in mind. In view of the complexity of information provision at the EU level, the Europa Web site has developed remarkably in recent years. Given the European Commission's new focus on Communicating the EU to Europe's citizens, and the aforementioned advantages of the Internet as a method of communicating Europe-wide, this will undoubtedly grow into a vital tool in the EU's communications arsenal.

The Commission, arguably, led the way in consultations with citizens and civil society organizations; however, there is always a disadvantage in being the first on the scene. The Commission is evaluating its procedures concerning consultation through online means on a regular basis, and we should expect that the phenomenon of direct consultation will grow on specific topics. Whether this will actually change our understanding of governance in the EU is not related to the increase in the use of the Internet as a tool for consultation: the large majority of citizens are not aware and do not use these consultation tools.

Plan D is a bold attempt on the part of the Commission to attempt to develop a series of public spaces for dialogue on the EU and European issues. The future of this is uncertain at present, but this shows that the Commission is willing to invest in efforts to use new ICTs and other forms of media to promote a sense of Europeanness.

On internal aspects, as in any public administration (and any other organization), the use of Web-based applications to support and encourage interaction between different departments and sections relies, to a large extent, on human willingness to do so. However, the European Commission appears to place a great emphasis on taking advantage of the communications revolution to reorganize its (relatively small) number of staff and related bodies.

In relation to member states and linking together national institutions at the European level, with the IDA's successor program, IDABC, gaining further competencies in the European framework, there is a more coherent level of e-government activity at the EU level, which, in all likelihood, will continue in the foreseeable future, extending into such areas as Social Security payments, where there is a clear and stated need for EU-wide activity. Greater use of the IDA platform has already been foreseen, as the TESTA network will be upgraded (to s-TESTA), which provides a more secure environment for interaction between national public administrations.

## CONCLUSION

The EU's case is slightly particular, in the sense that this is a new and emergent level of governance outside of the e-goverment debate as well. Therefore, the EU institutions, and particularly the European Commission has been able to be far more creative and innovative than the public administrations in its member states. By elaborating on the Commission's activities in four key areas—information, interaction, impact, and implementation at the EU level—this article has shown that the EU has made great use of the Internet to develop EU-level activity in policy-making and political spheres. This has always been with the aim of reforming the EU and building better governance.

Although there remains much to be done in terms of really understanding the implications of developing the tools and applications of e-government at the EU level, the EU has made progress in these areas: there has been evidence of the emergence of a harmonized approach to using electronic tools of communication and information in the activities of the European Commission, which started as various piecemeal, ad hoc initiatives set up by various departments in the EU institutions. Further research needs to be carried out in how to make these applications more relevant to European citizens and organizations to ensure that the implications of e-government are actually transformed into public value.

In all of this, the role of the EU's institutions has not been to centralize all activity relating to use of digital tools but to act as a coordinator between different jurisdictions and levels of government and public administration: this is a challenging task and looks to continue to be so in the future.

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## KEY TERMS

**Consultation, the European Commission, and Civil Society (CONECCS):** (http://europa.eu.int/comm/civil_society/coneccs/index_en.htm) CONECCS provides a database maintained by the European Commission's Secretariat-General. It is separated into two parts: a list of EU formal or structured consultative bodies, and a list of nonprofit civil society organizations established at the EU level.

**EUROPA:** The name given to the EU's Web site (http://europa.eu.int). First created in 1995, it has evolved over the years. Now in its second generation, EUROPA II, the site is the main place to find all official EU-related information, and acts as a portal to most other official EU sites.

**European Union Institutions:** Collectively the term given to the official institutions in the European Union. It includes the European Commission, the European Council, the Council(s) of Ministers, the European Parliament, the Committee of the Regions, and the Economic and Social Committee.

**Interactive Policy Making (IPM):** The tool created by the European Commission to attempt to involve more stakeholders in the consultation process. It has two main

features: one is the Your Voice in Europe tool, the other is the feedback mechanism, which allows for various contact points across Europe to provide data concerning existing EU policy areas.

**Interchange of Data between Administrations (IDA):** The original program providing the opportunity for different national public administrations to interact electronically at the EU level. Now succeeded by the IDABC program.

**Interoperable Delivery of European eGovernment Services to Public Administrations, Businesses and Citizens (IDABC):** Successor of the IDA program.

**Trans-European Services for Telematics between Administrations (TESTA):** The IP (Internet)-based infrastructure for the IDA program. It is succeeded by the s-TESTA infrastructure.

# Evaluating Methodologies of Financial Cost and Benefit Aspects of E–Government

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## INTRODUCTION

The purpose of this article is to survey the financial cost and benefit of e-government and the evaluation methods utilized in the implementation of information technology (IT) projects in general, and e-government projects in specific.

## BACKGROUND

Evaluation methodologies typically are grouped by "… relevance, effectiveness efficiency, and internal functioning," (Van Giles, 2002). Cost-benefit rationalization is one of the key factors used in whether to implement e-government projects particularly when more advanced features of e-government that use transactional and integration aspects of governmental functions are the deliverable goals. Frequently, IT cost exceeds initial estimate (Jeffery, 2004; Sassone, 1988). IT benefit are hyped, cost underestimated, and the purported efficiency never materialize. Financial analyses are the main tools used to analyze capital expenditure including IT related investment (Sassone, 1988). However, the limitations of these kinds of analyses are that the cost is realized instantly and the intangible benefit is realized later or not at all. Nevertheless, rarely do most IS managers doubt that their projects are financially and strategically needed for their organizations. The conundrums most e-government project managers face is convincing top management the absolute necessity of their projects by providing strong rationale for IT investment, and estimating an acceptable return on investment (Jeffery, 2004).

Another problem with assessing IT investments for e-government is the productivity/information paradox (Thorp, 2003). This phenomenon is observed when assessment of IT benefit becomes confounded due to the interactions of many factors both tangible and intangible benefits. The government agency in question, in most instances, is unable to identify the productivity gains due to IT investments related to e-government. Dedrick, Gurbaxaui, and Kremer (2003) review clearly refutes the productivity/information paradox:

*At both the firm and the country level, greater investment in IT is associated with greater productivity growth. At the firm level, the review further concludes that the wide range of performance IT investments among different organizations can be explained by complementary investments in organizational capital such as decentralized decision making systems, job training and business process redesign.*

Investment in IT is not only for process automation but also an enabler for reengineering organizational processes, for example, functional integration systems such as enterprise resource planning (ERP) systems (Dedrick et al., 2003; Jeffery & Leliveld, 2004). Well integrated ERP for an e-government application can result in more productivity gains than gains warranted by automation only.

## THE STRUCTURE OF THE ARTICLE

The article surveys some of the methodologies used to access the cost of e-government and assessment of benefit due to capital expenditure in system hardware, software, and related telecommunication outlays for fast inter connectivity. Various approaches to measure e-government related cost vs. benefit will be surveyed. Each method's advantages and disadvantages will be briefly elaborated in their respective sections.

## ASSESSMENT METHODOLOGIES

Accurate measurements on the return of investment in e-government require accurate accounting of input, output, and processes. Measurement accuracy is critical to the usefulness of the IT assessment (Dedrick et al., 2003; Jeffery, 2004). What makes an effective e-government? An effective government should at least include the following attributes (Bannen, 2001):

- Should be able to reduce transaction processes both in cost and time
- The customers or clientele are keenly interested in IT and are heavy users of e-government services

- User friendly, fast, accurate access of information, and low cost of internet services subsided by various government agencies
- Confidentiality of information collected with secure transactions
- Cost sharing of providing e-services between the users and the government agencies
- Reengineering the government process for better effective services
- Innovation in newer service delivery processes
- Conduct a pilot e-government system project before launching a full blown system and learn from the experiences
- Using a short time frame to make e-government project operational
- Providing a strategic leadership to change the culture of government operations through e-government

The constant innovations and emulations of best practices in service delivery are rendering technology focused strategic solutions to real problems both in the private and public sectors. Public sector reform is not an end itself. Rather it is a means of transforming the public sector from a bureaucratic paradigm process to a mean and lean process enabled by information technology. In order to reform the public sector successfully for a technology-enabled process, the following three themes are invariably present (Sassone, 1988):

- Transparency and accountability to the public
- Ubiquitous service on demand
- Return on investment should be realizable in a short period of time to add value to the taxpayers

The remainder of the article shall review the literature of tools to measure the cost-benefit and effectiveness of technology enabled processes by e-government. These tools are by no means the only ones available but for the purpose of this article are: (1) balanced scorecard (BSC), (2) DMR result chain, (3) cost-benefit analysis, (4) cost effectiveness analysis, (5) e-government effectiveness, (6) information measurement multi-criteria (IMM), and (7) e-government benchmarking.

## THE BALANCED SCORECARD FRAMEWORK

The impact of e-government on efficiency and effectiveness can be assessed by the balanced scorecard (BSC). BSC is a specific performance measurement system applicable to a specific predefined domain (Norton, 2002; Volker, Rakich, & French, 2001). It is based on organization's strategy and goes beyond financial metrics to assess e-government achievements. Volker et al. (2001) described the BSC framework as follows:

*It is a holistic methodology that converts an organization's vision and strategy into a comprehensive set of linked performance and action measures that provide the basis for successful strategic measurement and management.*

BSC was first suggested in the early 1990s (Kaplan & Norton, (1992). It was quickly adopted and widely used for performance measurement for the private sector. It is a framework to assess performance, for example, a system such as e-government and benchmark the benefit gained against the status-quo processes before launching the system. It is an all eclectic methods that do not focus solely on financial metrics, where financial measurements invariably focus on past performance and have limited usefulness to forecast future performances. Hence it could be argued, focusing solely on financial metrics is not a robust predictor of the strategic direction of the organization. BSC, on the other hand, according to Volker et al. (2001, p. 16) it provides:

*... an enterprise view of an organization's performance by integrating financial measures with other key performance indicators around customers' perspectives, internal business processes, and organization's growth, learning, and innovation.*

BSC is designed to assess performance in four key areas and is a good candidate to assess the performance of e-government system:

- Financial scorecard
- Customer satisfaction
- Internal perspective
- Learning and innovation

Government that embark on e-government planning should develop an integrated balance score card to measure its efficiency and effectiveness. Before launching BSC, the management should go through several common phases: mobilization of all stakeholders, design and rollout, and sustainable execution of the strategy by involving key personnel. Best practices of transformation of organization requires issues of leadership, culture, and team work (Norton, 2002). The advantages of utilizing BSC in a quest to plan and implement e-government should be based on whether the new system satisfies the diverging needs of various stakeholders. The stakeholder could be residents, taxpayers, government employees, policy makers, elected officials, regulators, vendors, and other gov-

ernment jurisdiction in local, state, or federal level. The disadvantage is, it is unclear where most government jurisdictions are currently in utilizing BSC type system to assess the effectiveness of e-government. This is a potential area of research interest for scholars who specialize in e-government assessment topics.

## RESULT-CHAIN FOR MEASURING IT BENEFITS

Chief executives of many firms increasingly see IT as "… core strategic tool and believe that sophisticated pervasive IT will be needed to fulfill their future business objectives," (Harrison & Learmonth, 1999). Similarly, top government agency leaders and elected officials believe that e-government enabled by sophisticated pervasive IT is key to fulfill the objectives of lean and mean government services delivered at the lowest possible cost and satisfy customers and constituents requirements. Business and government leaders, however, are discovering that substantial investment in IT is not resulting in measurable organizational benefit that are purported to bring. Many studies have concluded that massive IT investments, including in e-government technology, result only in marginal benefits (Jeffery, 2004; Chesley & Wenger, 1999). These seemingly contradictions between expensive IT expenditures and questionable productivity gains are known as the information paradox (Thorp, 2003; Dedrick et al., 2003). Thorp suggests that realizing business benefit through IT can only be achieved if IT personnel and top managers work as a team. Some of the solutions proposed include (Thorp (2003):

- Identify and manage benefit provided by the organization
- Identify programs vs. project
- Manage IT portfolio and initiatives continuously

The DMR Consulting group has proposed a benefit realization technique known as DMR Results Chain. It is an enabler of "… the IT practitioner to sit with business partners and identify specific benefit, then support the identification of all final and intermediate steps and outcomes required to achieve these benefit" (Harrison & Learmoth, 1999). The balanced approach of portfolio management insures that no contradictory and incompatible IT initiatives are deployed without ascertaining that such projects contribute substantial benefits, and are integrated seamlessly with existing projects (Jeffery et al., 2004). The advantages of using these approaches may result in making sure that spending in IT yields tangible benefit such as user friendly interfaces, less system downtime, and receiving quick and accurate information by users. The disadvantage is that smaller organizations may not have the resources, technology sophistication, and priorities to implement and manage e-government systems portfolio in a systematic ways.

## COST-BENEFIT ANALYSIS (CBA)

Cost-benefit analysis deals with the measurement of added value of benefit due to some actions less the cost incurred for those actions. Some of the benefit may be intangible in nature and measuring it becomes subjective. In information technology investment, the cost of hardware, software, and personnel is straightforward to measure. However, measuring the benefit due to investment in e-government becomes blurred due to benefits that are both tangible and intangible in nature. Typical analytical tools used for cost-benefit analysis (King & Schrems 1978; Mantel & Teorey, 1988) include: discount cash flow, life cycle cost analysis, use of marginal cost analysis rather average cost, comparison of alternatives with or without additional cost, use of sensitivity analysis, use of present value, and opportunity cost of capital.

## COST EFFECTIVENESS ANALYSIS

Cost effectiveness analysis (CEA) for e-government deals with better results or output with the same or comparable input. The methods to analyze the information on the effectiveness of e-government services may include: Web site traffic pattern, behavior of users, Web site performance metrics, accessibility of Web site, information accuracy, usability of site, adequate help by customer service staff, and timeliness of information (Clemons, 1991; Nicoll, Robinson, & O'Hanlon 2004). CEA is a better benchmarking tool suited for e-government projects (Van Giles, 2002). The advantages of using CEA is it has the capability to compare similar e-government initiatives among similar jurisdictions within a city, county, state or country; it also has the unique capability to pin point performance lags and provide strategies to ameliorate deficiencies. Most of the data for such purposes are collected from internal sources related to internal managerial practices to monitor and benchmark the system. Quality of service (QS) is a high priority goal of most government jurisdiction for e-government service. Measurement of quality of service through surveys of constituents can suggest area of improvement for user satisfaction (Van Giles, 2002). Van Giles argued that "service quality involves mainly qualitative indicators and is often measured as a result of the gap between

customer's perception and expectations of a service." The disadvantage of using quality service as metrics for e-government purpose is that quality of service is targeted and depends heavily on the perception of direct consumers of the specific e-government service and as such is difficult to propose a standard quality of service model in e-government.

## E-GOVERNMENT EFFECTIVENESS

The evaluation of e-government effectiveness, for the most part, focuses on intermediate out comes (Chesley et al., 1999). Most of the evaluation methods used to measure benefit related to e-government systems are: Web site hits, volume of transactions and service quality, end user and provider feedbacks, manual vs. online applications (Bovaird, 2002; Thorp 2003). Invariably, intangible benefits are difficult to assess accurately due to the concept known as information paradox. According to Van Grenbergen and Amelinckx (2004): "Many of the e-business benefits such as better customer service, increased responsiveness, and faster deliveries are intangibles that are difficult to translate into monetary benefit." Some studies have reported that 3/4 of information systems investments do not provide any measurable value (Jeffery, 2004). Once e-government systems is implemented, service benefit are difficult to measure, particularly, when one is trying to measure government effectiveness, transparency, or services. Multi-criteria analysis is an alternate robust technique that can assess tangible and intangible benefits provided by e-government.

## INFORMATION MEASUREMENT MULTI-CRITERIA ANALYSIS

Multi-criteria analysis is an all encompassing technique that utilizes both qualitative and quantitative tools to assess the effectiveness of e-government. The steps of multi-criteria analysis typically consist (European Communities Report, 1999):

1. To define the criteria for evaluation of benefit and or effects
2. To summarize and classify variant characteristics
3. To assign quantitative target values or acceptable qualitative description
4. To use of an expert scores the respective effects or benefit
5. Finally, weighted scores of classification of effects and benefit

The attractiveness of multi-criteria analysis is that it gives a guideline for all stakeholders in problem solving and decision-making (Sassone, 1988). One advantage of multi-criteria analysis is that it has the capacity to incorporate attributes to estimate return on investment (ROI) even when cost related data is not available (Van Giles, 2002). The limitation of multi-criteria analysis is that it is heavily dependent on subjective scores and, therefore, is highly dependent on trained expertise and experience for objective evaluation.

## E-GOVERNMENT BENCHMARKING

The purpose of e-government benchmarking is to identify, compare and contrast performance deficiency to best practices. For example, areas that need benchmarking related to e-government may include: electronic service delivery targets, reorganized government functions to create a seamless information exchange, leading state-of-art e-government services (UK e-government benchmarking report, 2001).

A benchmarking template on a framework based on change, supply, capability, and demand is sometimes used, as is the case in the United Kingdom (UK e-government benchmarking report, 2001). The template can act as data warehouse for qualitative and quantitative changes in information. The information is then used to compare the current level of service against the best practices. The advantage of using a template framework is, it avoids the mentality of reinventing the wheel to evaluate e-government projects. The disadvantage is the template may have to be reconfigured to fit a unique e-government implementation situation; and even then the benchmark template may not make any sense due to unique factors of that project.

## FUTURE TRENDS

E-government is a growth area of the information technology sector. Because of its relative newness, most government entities are overwhelmed by the choices that are available in the market place. Prudent policy makers and chief information officers will have to use a systematic approach in introducing technology solutions in their respective divisions of their organizations. A promising tool to manage a multitude of project is the IT portfolio management (ITPM) technique that can assess the usefulness, risk, and potential integration of e-government solutions.

## CONCLUSION

The article surveyed some of the common evaluating methodologies of cost and benefits aspects of e-government. Although the coverage of the methodologies was directed to e-governments applications, the approaches and techniques discussed are more general in their applications and should not be restricted only to e-government applications. E-government efficiency can measure the quality, frequency, response time of electronic services. The underlying purpose of e-government efficiency is to do more with less. Cost measurement of e-government can be assessed by CBA and ROI. However, due to confounding of attributes of tangible and intangible benefit, assigning a financial ratio is difficult if not impossible. Targeted criteria performance can be measured by benchmarking and cost effectiveness analysis. The difficulty with such tools is their inability to compare and contrast performance among and between similar structural organization because of cultural, economical, social and political structural differences (Moe, 1995).

E-government effectiveness is difficult to assess because of information paradox. The inability to measure intangible benefit, measurement problems of cost assignments, benefit, cultural barriers and resistance to adoption of new technology are major hurdles in the evaluation of e-government effectiveness. E-government performance evaluation is fraught with many difficulties because of its formative nature: jurisdiction; governance; effectiveness; resource where withal; level of technological sophistication; and finally the constituents tech sophistication and quality of service of the e-government services. Policy makers can use tools such as the e-government IT portfolio management (Jefery & Leliveld, 2004) in staged implementation. The implementation can be divided into: target a specific organization in the implementation of e-government rather than the whole organization; limit portfolio components in each stage of implementation; limit the number of analytical metrics to less than ten; adjust measurement metrics to a specific stage of the life cycle of e-government implementation. These tools may not solve the measurement problems of e-government effectiveness, nevertheless, in our opinion, are better e-government evaluation techniques to ponder about.

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## KEY TERMS



**Balanced Scorecard:** An analytical framework to assess performance beyond the financial measures and using with other key performance indicators around customers' perspectives to manage and evaluate business strategy, measure operations improvement, build organization's capacity, and communicate results to all stakeholders.

**Benchmarking:** Comparing e-government service metrics to the best practices in the public sector.

**Cost-Benefit Analysis:** A comparative analysis between financial cost and intangible benefit. The benefit may exceed the targeted objectives and difficult to measure in monetary terms.

**Cost Effectiveness Analysis:** A non monetary quantitative analysis between the cost and effectiveness of specific resources in comparison to the effect of other resources.

**Information Paradox:** The difficulty in measuring the productivity gain due to IT investment and automations.

**Multicriteria Analysis:** The use of quantitative and qualitative indicators to measure benefit of e-government.

**Service Quality:** Uses mainly qualitative indicators and is often measured as a result of the gap between customer's perception and expectation of a service.

# Evaluation Framework for Assessing E–Democracy Policy

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## INTRODUCTION

E-democracy, defined in this chapter as "the use of information and communication technologies in democratic processes," covers a range of methods by which governments and communities engage with each other. This includes a variety of activities that support public participation in democratic processes, such as electronic voting, online consultation, Web-based discussion forums, electronic petitions to Parliament, using the Internet to Webcast parliamentary debates, and digital polling and surveys.

E-democracy is a fairly recent and evolving field, with rapid developments at both practical and conceptual levels. Innovative projects and initiatives are being introduced in many different countries, but this process is rarely guided by a comprehensive policy framework or informed by systematic evaluation. In 2001, an OECD review concluded that "no OECD country currently conducts systematic evaluation of government performance in providing information, consulting and engaging citizens online" (OECD, 2001 p. 4).

Writers in the field have noted that the evaluation of e-democracy initiatives has not developed as quickly as public debate about the potential impacts, that evaluations are rare to date, and that there is no consensus on appropriate evaluation methodologies (Grönlund, n.d.). Examples of publicly available evaluations include the Scottish e-petitioner system (e.g., Malina & Macintosh, n.d.; Malina, Macintosh, & Davenport, 2001) and online consultation (e.g., Smith & Macintosh, 2001; Whyte & Macintosh 2000, 2001). Macintosh and Whyte (2002) have produced "a tentative interdisciplinary framework of evaluation issues and criteria" for electronic consultation. An OECD report (2003) lists evaluation issues for online engagement. However, overall there are few resources to guide evaluation in the e-democracy area to date.

## BACKGROUND

The government of the State of Queensland (Australia) is internationally acknowledged as having a particularly active e-democracy agenda and has trialed and evaluated a number of digital democracy initiatives. These initiatives were introduced within the context of an explicit e-democracy policy framework and subsequently evaluated under a comprehensive evaluation framework. The case study below sets out this evaluation framework.

## CASE STUDY: QUEENSLAND'S E-DEMOCRACY EVALUATION FRAMEWORK

The evaluation framework described in this case study provided for an assessment of Queensland's overall e-democracy policy, as well as individual initiatives (such as online consultation and e-petitions) introduced under the overarching policy framework. It takes into account evaluation dimensions of effectiveness (the extent to which designated objectives are achieved), appropriateness (to the particular policy and operating environment), equity of access, quality of service, efficiency, sustainability, and process enhancement.

### Evaluation Context

Given the emerging nature of e-democracy and its underlying knowledge base at this time, there is no definitive set of evaluation criteria or widely acknowledged outcome standards applied across the range of e-democracy initiatives being introduced worldwide. This evaluation framework is grounded in generic evaluation dimensions relevant to reviewing government programmes, for example,

national performance standards for provision of government programs in Australia (e.g., SCRGSP, 2004) and acknowledged policy good practice dimension (e.g., Henderson, 2000). However, the evaluation framework also allowed for a reasonable level of flexibility, so that emerging needs of decision-makers and implementers could be incorporated.

E-democracy provides additional avenues for participation and is not a complete answer to disengagement. Because is limited by many of the same factors as other engagement processes that are not specific to the medium (such as public disinterest or declining levels of trust in elected governments) success needs to be considered in this context, that is, what e-democracy contributes or value adds above traditional engagement processes. The evaluation framework therefore assessed outcomes relative to off-line processes rather than against a standard of full engagement.

Examining the success of e-democracy initiatives means taking the views of diverse stakeholders into consideration, including individuals and organisations in the community who have used it, those for whom it is relevant but who have not used it, providers of the service, key decision-makers, and other influential individuals and agencies with an interest in the process or its outcomes. The evaluation framework is built around input from multiple sources, including users, community non-users, and key informants such as the officers responsible for its delivery or accountable for its outcomes.

## Evaluation Purpose

The evaluation framework provides for a variety of purpose, specifically to:

- Assess the extent to which specific e-democracy initiatives meet their objectives and contribute to outcomes of the wider e-democracy policy framework
- Examine whether e-democracy initiatives provide an appropriate and sustainable approach in the Queensland context
- Assess the extent to which current e-democracy initiatives increase access among those in the community not reached by traditional engagement methods
- Determine the level of user and stakeholder satisfaction with the quality of e-democracy initiatives
- Assess whether the e-democracy initiatives provide a cost effective approach
- Identify ways in which e-democracy initiatives could be enhanced

## Key Evaluation Questions

- **Effectiveness:** Do the initiatives deliver intended outcomes? To what extent are designated objectives met
- **Equity:** Is there equitable access to the benefits of the initiatives
- **Quality:** What is the level of user and stakeholder satisfaction? Are relevant benchmark standards met
- **Efficiency:** Do the initiatives provide value for money
- **Appropriateness:** Are the e-democracy initiatives appropriate for the Queensland context at this time? Do they provide a relevant response to identified needs and/or opportunities in this area
- **Sustainability:** Do the initiatives provide a durable and generalisable approach to achieving the desired outcomes
- **Process:** How can the current initiatives be enhanced to provide better outcomes

## Information Needs

To address the evaluation questions above requires information on:

- Extent and manner of use (addresses effectiveness considerations)
- Range of users (addresses equity considerations)
- User and stakeholder satisfaction (addresses quality considerations)
- Input costs relative to outputs (addresses efficiency considerations)
- Relevance to need and/or opportunities given Queensland's policy and operating context at this time and the extent to which similar initiatives have resolved these elsewhere (addresses appropriateness considerations)
- Level of stakeholder support and operational/policy barriers to continuity (addresses sustainability considerations)
- User and stakeholder perceptions about design and operation generally (addresses process considerations)

## Information Sources

This information is collected through a range of sources appropriate to the information required, including:

- Statistics obtained from routine operations (e.g., usage rate, user profile)

- User surveys (e.g., to assess satisfaction with process)
- Community survey (e.g., to identify access barriers by non-users)
- Stakeholder/key informant interviews (e.g., on perceptions of relevance, benefits, areas for enhancement)
- Document review (e.g., cost data)
- Research and practice literature review (e.g., to review appropriateness issues, identify benchmark performance)
- Evaluator assessment, informed by diverse information sources (e.g., assessment of extent to which relevant government information standards have been applied, based on an assessment of Web site content, document review and key informant interview)

## Generic Indicator Areas

Generic indicators, measures, and information sources were developed under each of the seven evaluation dimensions. These were designed to apply to an assessment of the overall e-democracy policy as well as providing a basis for the development of specific indicators for evaluating individual e-democracy initiatives.

## Specific Indicators: Online Consultation

Each of the generic indicator areas under the evaluation dimensions is supported by specific indicators targeted at the particular e-democracy initiative being evaluated, taking into account the individual objectives of the initiative that contribute to the overall policy framework outcomes. For example, Table 2 shows the specific indicators used to evaluate Queensland's online consultation process (ConsultQld, see www.getinvolved. qld.gov.au/consultonline), together with the particular measures and sources appropriate for collecting the information for that indicator.

This evaluation approach provided the foundation for an evaluation of Queensland's online consultation initiative, conducted after 12 months of operation. User surveys and key informant interviews were found to work well in establishing the information base for the indicator areas under each evaluation dimension in order to provide a sound and comprehensive evidence base for evaluating this initiative's first year of operation.

# FUTURE TRENDS

The importance of evaluating government programs and activities is widely recognised. In practice, however, evaluation and monitoring often takes second place to implementation and ongoing development. The area of e-democracy is no exception. However, the gap between evaluation and practice is exacerbated for e-democracy programs because of the rapid pace of development and the growing popularity of e-democracy projects internationally. E-democracy initiatives are proliferating, but still, in the main, without a concomitant investment in developing a knowledge base guided by sound evaluation of these initiatives.

*Table 1. Generic indicator areas under each evaluation dimension*

| Evaluation Dimension | Indicator Areas |
|---|---|
| Effectiveness (i.e., in addressing common objectives of providing safe, secure, and efficient ways for engaging that are less limited by accessibility constraints) | • Usage rates<br>• Privacy, information security, and authentication standards met<br>• Nature and level of user concerns<br>• User perceptions on efficiency of use<br>• Access opportunity and self identified access barriers |
| Equity | • User profile<br>• Reason given for using online process |
| Quality | • User satisfaction with process<br>• Satisfaction with quality of content |
| Efficiency | • Unit cost (relative to off-line process) |
| Appropriateness | • Stakeholder perception of relevance<br>• Gap analysis against strategic developments in the field |
| Sustainability | • Level of stakeholder support<br>• Stakeholder perceptions of continuity barriers |
| Process | • User and stakeholder identified areas for enhancement |

*Table 2. Indicators, measures, and sources for ConsultQld evaluation*

| Result Area | Indicator | Measure(s) and Sources(s) |
|---|---|---|
| **Effectiveness*** | | |
| Effective use of avenue (submissions) | Usage rate (submissions) | Operational statistics, in particular: average number of online submissions received per issue (relative to number of paper submissions); and number of online consultations activities registered (as a proportion of total public consultations over the evaluation period) |
| Safety and security | Privacy standards met | Extent to which Queensland government privacy standards are fully complied with, based on independent evaluator assessment, informed by document review and key informant interview |
| | Relevant Queensland information standards fully met | Extent to which other Queensland information standards are fully complied with, based on independent evaluator assessment, informed by document review and key informant interview |
| | Authentication issues resolved | Stakeholder perceptions of nature, extent and impact of authentication concerns (key informant interview question) |
| | Other issue concerns, e.g. information misuse and defamation | Stakeholder perceptions of nature, extent and impact of other issues identified (key informant interview question) |
| | nature and level of user and general community concerns | User survey question e.g., "Did you have any concerns about personal privacy or security in using ConsultQld?"; response to general community survey question such as "Do/would you have any concerns about making an online submission?" with pre-coded responses e.g., "security of information,", "privacy," "other," with responses disaggregated by users/non-users; follow-up question on extent of concern and whether this would prevent the person using ConsultQld in the future |
| Efficient use | User perceptions | User survey question e.g., "Did you find ConsultQld easy and convenient to use?"; content analysis for comments re cost/ convenience issues of open-ended responses to process questions below and to "additional comments" question |
| Inclusiveness | Target group participation | Operational statistics, in particular: for submissions made by individual persons, number of submissions disaggregated by place of residence (home postcode), gender, age, indigenous/ethnic community affiliation, disability, and prior engagement activity level; for submissions made by organisations, number of submissions disaggregated by location (postcode), type of organisation, and community group being represented; relative to similar analysis of paper submissions |
| | Reason given for using online process | User survey question e.g., "If online submissions weren't available, would you have made a written submission on this issue? If not, why not?" with pre-coded response e.g., lack of time, have a disability that makes it more difficult, etc |
| | Response rate | Proportion of online consultations complying with established feedback standards and processes |
| | Timeliness of response | Average time between end of consultation period and posted government response (relative to off-line processes) |

*Table 2. Indicators, measures, and sources for ConsultQld evaluation (cont.)*

| | | |
|---|---|---|
| | Adequacy of response | User survey question e.g., "Were you satisfied with the feedback provided on the site about the outcomes of the consultation?" and reason for satisfaction or dissatisfaction |
| Effective use of avenue (information) | Usage rate (information) | Operations statistics, in particular number of unique visitors to the site, disaggregated by relevant type of user (e.g., community or government sector user) |
| User knowledge base | Self-identified knowledge increase | User survey question e.g., level of agreement to a statement like "Accessing the site has increased my awareness of consultation opportunities and processes" disaggregated by type of user (e.g., community or government sector) and by first time and repeat users |
| **Equity** | User profile | User breakdown by target group characteristics e.g., age, geographic location, etc |
| | Self-identified access barriers | General community survey question e.g., "Is there anything that prevents you from making an online submission if you wanted to do so?"; with pre-coded responses eg limited computer access, cost of Internet use, literacy skills, etc |
| **Quality** | User satisfaction with process (those making submissions) | User survey question e.g., "Overall, how would you rate the quality of the online consultation process?" with open-ended follow-up question as to why |
| | User satisfaction with process (by those receiving submissions) | Key informant level of satisfaction with process |
| | Satisfaction with quality of content | Key informant perception of level of informed content in submissions submitted electronically (relative to off-line processes) |
| **Efficiency** | Cost effectiveness | Unit cost to government per e-consultation (relative to off-line process), based on independent evaluator analysis, informed by document review and key informant interview |
| **Appropriate-ness** | Relevance, given Queensland policy and operational context | Stakeholder perceptions of relevance, based on independent evaluator assessment informed by key informant interview |
| | | Gap analysis against strategic developments in online consultation in the field, based on independent evaluator assessment, informed by international literature review |
| **Sustainability** | Stakeholder support | Level of key stakeholder support, based on independent evaluator assessment informed by key informant interview and document review |
| | Operational and/or policy barriers to continuity | Stakeholder perceptions of continuity barriers, derived from key informant interview |
| **Process** | User perceptions | User identified areas for enhancement of online consultations and positive/negative aspects e.g., "Was there anything you found particularly useful about ConsultQld?"; "Was there anything you found particularly unhelpful about ConsultQld?"; 'How could Consult Qld be improved?' |
| | Stakeholder perceptions | Stakeholder identified areas for enhancement of online consultations, derived from key informant interview |

*Table 2. Indicators, measures, and sources for ConsultQld evaluation (cont.)*

* *In addressing the designated objectives for ConsultQld i.e., effectiveness result areas 1-3 relate to the first objective of "to provide an additional avenue for the public to engage in the Queensland government's decision-making processes that is safe, secure, efficient and readily accessible"; the result areas of "inclusiveness" relates to the second objective of "to open up the Queensland government's decision-making process to those who may not be reached through traditional consultation methods," result areas 5-7 relate to the third objective of "to increase the transparency of consultation processes through the publication of consultation responses and the commitment to publish a government response after the consultation activity has closed," and the final two result areas under effectiveness relate to the third objective of "to provide a central location where the public can learn about consultation opportunities of which they may otherwise have been unaware".*

## CONCLUSION

E-democracy is a rapidly evolving and increasingly widely adopted component of digital interaction between governments and their citizens. However, the proliferation of projects and developments in this field is not being guided by a comprehensive body of knowledge about what works and what doesn't work and under what circumstances. Building systematic evaluations into program development provides a process for establishing this much-needed knowledge base. The Queensland case study provides an example of an evaluation framework designed specifically for e-democracy policy assessment and review of specific e-democracy initiatives.

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## KEY TERMS

**E-Democracy:** The use of information and communication technologies in democratic processes.

**E-Petition:** A petition (that is, a signed statement from a person or group of people making a formal request to Parliament about a particular issue or law) published on the Web before being formally lodged.

**Online Consultation:** Use of the internet to facilitate a process of discussion between those proposing a course of action and those likely to be affected by those actions.

**Policy:** Authoritative statements of general applicability establishing intent or planned action by governmental entities.

**Public Participation:** The involvement of citizens in governmental decision-making processes and activities.

# E-Voting in the United States



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## INTRODUCTION

Many aspects of government have seen improvements in reliability, customer interface, speed, and cost as a result of digital innovations. In some jurisdictions, the most antiquated aspects of government are the voting technologies used during elections. Such technologies are expensive and used infrequently, which discourages public investment in updates. However, in close elections, any unreliability in these technologies can have a major impact on who takes control of government. The 2000 U.S. Presidential election hinged on the state of Florida, where antiquated punch-card voting machines, combined with poorly designed ballots and unclear recounting standards, were blamed for a high degree of uncertainty during a drawn-out recount process.

This chapter looks at the growing adoption of e-voting in the form of direct recording electronic (DRE) machines in the U.S. following the 2000 election. Lawmakers enthusiastically endorsed the concept of e-voting with only a limited understanding of the risks involved. E-voting can be implemented in a number of ways—with or without a printed paper ballot, with open or proprietary software—that affect some of the risks associated with it. But some theorists of complex systems and many computer security specialists warn that any complex technology like e-voting machines are prone to failure and should not be trusted to count votes. A loosely coordinated online protest movement offered the argument that election reformers were moving too fast. E-voting since has received negative press coverage, which, in some cases, has slowed down the adoption of or led to additional requirements on the use of DREs.

## BACKGROUND: THE POTENTIAL OF E-VOTING

In the aftermath of Florida, e-voting machines seemed the obvious choice to move election administration into the 21st century. The media pointed to the outdated nature of most election technologies across the country, and many state governments worried that they would be the next Florida. Since elections are administered primarily by state and local governments, there are a variety of election technologies in place, driven largely by the size, resources, history, and preferences of the different counties and townships. These different options include the following:

- **Paper:** Voter marks preference next to printed list of options and drops ballot into sealed box; ballots are counted manually.
- **Levers:** Voter pulls lever next to candidates name; machine records and tallies record.
- **Punch Cards:** Voter uses computer-readable card to mark vote by punching hole into numbered boxes indicated by a ballot booklet or directly onto a ballot card. Computerized tabulation machine reads votes by identifying holes in the ballot.
- **Optical Scanning:** Voter marks computer-readable paper ballot; computerized tabulation machine tallies votes.
- **DREs:** Voters select candidate listed on a computer screen by touching the screen or button directly. Votes are tabulated on a computer.

The last two options are the most reliant on digital technology and the most recent. Up until the 2000 election, about half of jurisdictions used either paper, punch card, or lever. More than 40% used optical scans, and less than 9% used DREs (Caltech/MIT Voting Technology Project, 2001a). Since 2000, DREs have been a popular choice for new systems, and it is estimated that almost one-third of votes in the 2004 elections were counted by a DRE (Seelye, 2004).

The process of voting with a DRE begins when the voter arrives at the polling station and is given a memory card to insert into the machine. Voters select from a touch-sensitive screen or parallel button the candidate of their choice. The votes are tabulated internally by the machine and reported to a central counting station. In the aftermath of Florida, DREs seemed an ideal choice. They claimed to record each vote perfectly and do away with the slow and potentially subjective recounts featuring pregnant, dimpled, or hanging chads. DREs had other advantages: they were user-friendly, reported votes more quickly, prevented voters from voting for more than one candidate in the same race, and reminded voters if they had not voted in a particular election. DREs also offered to help the visually impaired through the use of larger screens and

earphones, prompting support from representatives of the disabled. DREs gave the ability to present the ballot in different languages at little additional expense, which facilitated diverse voting populations.

The effect of Florida brought the usually non-contentious issue of election administration to the top of the policy agenda. The perceived weaknesses of the traditional decentralized election system prompted greater federal-level involvement. In October 2002, the federal government passed the Help America Vote Act (HAVA), which provided federal funding for the replacement of older machines and required that new machines allow for disabled access, which had the effect of promoting e-voting machines.

## E-VOTING CONCERNS

Given the advantages of e-voting, it may come as somewhat of a surprise that a number of scholars and commentators, led by computer security specialists, began to raise qualms about its adoption. Three criticisms were made (Moynihan, 2004). The first was that DREs did not count votes as reliably as most alternative technologies. The second was that the reliance on software created the potential for error or tampering. The third was that DREs are currently designed so that such errors are unlikely to be caught or remedied.

A survey by the Massachusetts Institute of Technology and Caltech (2001a) found that in 2000, DREs had higher instances of residual votes (1.6%) than hand-counted paper (1.3%) and optically scanned ballots (1.2%). Residual votes are votes that are lost because voters choose more than one candidate, create an unreadable ballot, or leave a blank ballot. The residual vote is the traditional measure of voting system reliability. It might be expected that as DREs develop better user interface and as voters become more used to them, this rate of error is likely to decline.

The more serious criticisms have to do with the reliance on software, its proprietary nature, and the absence of voter-verified paper votes. Software tends to be complex. Computer security specialist Bruce Schneier (2000) points out, "Even a simple computer program has hundreds of thousands of lines of computer code doing all sorts of different things. A complex computer program has thousands of components, each of which has to work by itself and in interaction with all the other components" (p. 6). More than alternatives, DREs in the U.S. rely on complex software to create user interface and to count the votes. DREs, therefore, can be considered complex systems. Systems theorists, especially Charles Perrow (1999), warn of the tendencies of high-risk complex systems to fail. Perrow's (1999) natural accident theory argues that the central problem of complex systems is that they make accidents inevitable. Errors in multiple parts of complex systems can lead to dramatic and unexpected system failure. The potential for failure increases when the complexity occurs in tightly coupled systems that have the potential for unpredictable feedback loops. System failure, therefore, occurs not as a result of predicted vulnerabilities but as a result of errors occurring and interacting in unexpected ways.

These concerns are echoed by many computer security specialists, who point out that computer systems have bugs that can cause them not to malfunction and stop but, instead, to continue running and behave in ways unintended by designers. In the case of voting, DREs may appear to count votes but may do so incorrectly. There is federal and frequently state testing of DREs machines, but the testing process is opaque. Testing labs are paid by the vendors rather than the government and do not provide information about the nature of the tests or the credentials of the testers (Harris & Allen, 2004). The federal standards against which the machines are tested were revised in 2002 but have been criticized for failing to test commercial, off-the-shelf software used in DREs and because they remain "notably weak in the areas of secure system design and usability" (Mercuri & Neumann, 2003, p. 37). More generally, prevention that relies on verification is always problematic, since testing is imperfect and will miss bugs that inevitably occur in complex software. "Testing for every known weakness is impossible. … Testing for all possible weaknesses means testing for weaknesses that you haven't thought of yet. It means testing for weaknesses that no one has thought of yet; weaknesses that haven't even been invented yet" (Schneier, 2000, p. 337).

In the U.S., election systems are provided by private-sector vendors. The oligopoly of three firms that dominate the market for DREs has reduced further the transparency of the software. Vendors use proprietary software, which means that, apart from outside testers, no members of the public can view the underlying computer code. The vendors argue that they have a commercial interest in maintaining the secrecy of their product and that such secrecy reduces the potential for hackers to introduce bugs into the system. This security-through-obscurity approach has been criticized by security specialists as being outdated; it lost credibility when a copy of the source code of one of the primary vendors, Diebold, became available on the Internet. Computer security specialists at Johns Hopkins University and Rice University undertook a line-by-line analysis of the source code, which revealed several vulnerabilities within the software and led them to conclude, "The model where individual

vendors write proprietary code to run our elections appears to be unreliable, and if we do not change the process of designing our voting systems, we will have no confidence that our election results will reflect the will of the electorate" (Kohno, Stubblefield, Rubin & Wallach, 2003, p. 22). The credibility of Diebold and e-voting machines was called into question further when it was found that employees in California and Georgia, in violation of election laws, had introduced untested patches shortly before the election in order to cover problems in the software and did not tell authorities. As a result, the California Secretary of State cancelled the use of Diebold machines in the 2004 election.

An alternative to the current model of proprietary software exists. In Australia, officials have employed an open-source approach to software. The source code was designed by a private company to the specifications of public officials and then posted on the Internet so that any citizen could comment on it. Changes were made to the code as a result of feedback, and the final code was verified by an independent auditor. The principle of open-source software is that transparency encourages designers to avoid errors in the first place and allows members of the public to spot and warn of any problems that continue to exist.

The U.S. also might learn from abroad when it comes to finding an appropriate level of complexity in e-voting technology. India's e-voting machines were implemented without major criticism and cost less than 10% of DREs in the U.S. The key to India's e-voting machines' low cost and relative security is that they are much less complex and, indeed, are little more than adding machines that shut down if anyone tries to tamper with them. The software is simple and embedded onto a microprocessor that cannot be reprogrammed. The software required to run U.S. DRE machines is necessarily more complex, as it must work with a Windows operating system, encryption, touch screens, backup servers, voice-guidance systems, modems, and PCMCIA storage cards (Weiner, 2004).

The proprietary nature of the software and the secrecy of the testing system in the U.S. have sidelined the potential for citizen involvement in the electoral process to act as a safeguard against error or electoral fraud and has not helped public trust in electoral technology. In September 2004, 42% of respondents in a national survey expressed concern about potential vote tampering in DREs, and 38% were worried about the vote-counting accuracy of the DREs (United Press International, 2004). The results are indicative of a broader lack of confidence in elections systems. The Commission on Federal Election Reform (2005) cited public opinion polls that showed that the majority of Americans were not confident that their votes would be counted accurately. Other polls have shown that 86% of Americans agree that "we clearly have a major problem in the way that votes are cast and counted and this needs to be fixed" (Moynihan & Silva, 2005, p. 32).

Initially, criticisms of DREs came mainly from computer security specialists and some investigative reporters, notably Harris (2004), who maintained linked Web sites, organized online petitions, and documented cases of apparent e-voting problems around the country. Eventually, the news media started to cover the issue, especially as states began to adopt DREs and found problems. The *New York Times* ran an editorial series that was critical of DREs and urged adoption with greater safeguards. The most frequent reform suggestion was to add printers that provided a voter-verified paper audit trail (VVPAT) to DREs.

The proposal for VVPATs reflected another system oversight of most DREs. Schneier (2000) argues that computer systems should be designed on the assumption of failure and should incorporate safeguards that warn of and seek to remedy the failure. But DREs are designed on the assumption that they will record votes perfectly and that there will be no controversy that requires a recount. Therefore, they do not have a basis upon which it can be determined if the machines miscount the vote. DREs maintain an internal tabulation of votes received that can be retrieved, but these totals are not verified independently and may reflect any error that is occurring in the machine.

VVPATs would enable a recount if a machine were unable to tabulate a vote or if its vote totals were suspect. Voters could assess whether their votes were reported accurately by the computer, making them able to alert poll workers if the machine was not recording correctly. The paper votes, once verified, then would be deposited in a ballot box to be reviewed, if necessary. Recounting paper votes could be done more quickly by including a barcode on the printed paper that would enable another tabulating machine (produced by another manufacturer) to count the paper votes automatically (Mercuri, 2002). This would allow large-scale cross checks of DREs and paper ballots. The use of encryption could ensure further the secrecy and security of the ballot, while allowing for multiple verifications of the process (Chaum, Ryan, & Schneider 2004).

Opponents of VVPAT verifications argue that they are costly and unnecessary. VVPATs also add another layer of complexity to the voting process (if, for example, printers break down), and are less accessible for visually or motor impaired voters at a time when HAVA requires election officials to ease disabled access. Finally, VVPATs create a potential for the old-fashioned stuffing of ballot boxes. Despite these concerns, by 2005, 25 states had required VVPATs for the 2008 election, with 15 states

using the VVPAT as the official record of the vote for recounts. Another 14 states had proposed legislation to adopt VVPATs (Electionline, 2004).

## THE FUTURE OF E-VOTING

E-voting is certainly not a U.S. phenomenon. Many other countries have adopted or are piloting e-voting machines, including countries as diverse as Venezuela, Brazil, India, and Australia. The U.S. experience offers some lessons, but generalizing from any single case is always risky, and the experience with e-voting has varied in other countries.

Outsiders looking at the U.S. experience might reasonably conclude that the problems are not so much with DREs but with the manner in which e-voting has been adopted. There are different aspects that shape how e-voting systems are used. The political aspect shapes who has authority to select and to oversee voting systems and the role and requirements of private vendors. Political traditions and characteristics in the U.S. have shaped how elections are run, most notably a cultural distrust of centralized government control of any function, a traditional deference to state and local governments, and private provision of election systems. The problems with older voting systems in the 2000 presidential election and the subsequent controversy over DREs have amended these political dimensions somewhat, creating federal standards for voting systems with many states requiring vendors to provide VVPATs. However, some of the basic problems associated with DREs (i.e., proprietary software) reflect basic political differences between the U.S. and other countries that have adopted a more central role for government in e-voting.

Technical aspects of election systems relate to the choice of an operating system and interface, and procedural aspects shape staff training, machine audits, and the practices governing the control, use, and storage of machines. Proponents of e-voting elsewhere can and, in cases such as Australia and India, have done things differently than the U.S. to ensure that DREs are more secure and that the public has a relatively high level of confidence that votes will be counted accurately. Some of the lessons from the U.S. case are as follows:

- Proprietary software that relies on a security-through-obscurity approach should be avoided; a carefully run open systems approach will foster greater transparency by involving qualified members of the public to assess software.
- Less complex e-voting systems can reduce the potential for errors to occur and can make the technology underlying the system more understandable to the public.
- Creating a voter-verified paper trail requires additional expense but provides a badly needed source of independent verification that will spot errors and increase citizen confidence in the voting process.
- A uniform testing system is desirable, with clear standards, testing procedures, and high-capacity independent testing labs paid for by the government.
- A number of more minor suggestions have been made to reduce further the potential for error (Caltech/MIT Voting Technology Project, 2001b). These include moving toward a more simple and secure tabulating mechanism, one separated from the more complex user interface part; removing the test status of DREs, eliminating the chance that there will be differences in the DRE actually tested and the one employed on election day; and frequent and random audits of machines beyond disputed elections.

It remains to be seen whether the U.S. will learn these lessons, although there has been progress on the issue of VVPATs. More daunting is the prospect of moving away from the proprietary nature of the source code software and asserting more direct public control. The dominant private vendors have successfully organized to resist this change. Pessimists argue that even with such changes in place, elections are too important to be trusted to technology that can be manipulated and may be mismanaged. Failure of DREs has dramatic consequences for democracy, unlike failure in other aspects of digital government. While the crashing of government Web sites might be an unfortunate inconvenience, it does not threaten the sanctity of the democratic process. If accidents in complex, high-risk systems are as inevitable as Perrow's (1999) natural accident theory suggests, DREs should be shelved indefinitely. The adoption of DREs is especially risky in countries that have a weak civil society, lack an independent press, an authoritarian government, and a weak capacity to adequately test machines. Such conditions provide a scenario where elections could be rigged without the ability of independent election monitors to identify where the transgression occurred.

## CONCLUSION

For future research, one avenue that demands investigation is why election officials were willing to adopt e-voting, even as criticisms came to light. This requires the surveying of election officials about their understanding of the risks and benefits of competing election technologies and about the additional factors they considered when choosing it. A similar survey of the general public

would offer insights into how well-informed the public is on this issue as well as the degree of trust it has in the new technology. Such surveys would take on additional value if done longitudinally, as researchers could observe how attitudes change as election officials and the public become more familiar with e-voting. Another challenge for researchers is the traditional reliance on residual votes on any examination of the relative performance of different voting systems. Since e-voting machines could malfunction without generating any residual votes, this standard is inadequate to reflect the risks of e-voting.

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## KEY TERMS

**DRE:** Direct recording electronic machines require voters to select their choices on a touch-sensitive screen or parallel button at a polling station or kiosk. The votes are internally tabulated by the machine and reported to a central counting station.

**E-Voting:** This generally refers to the process where the voter inputs their vote on a computer, and the vote is tabulated by the computer. In this chapter, e-voting refers to the use of DREs, but others have referred to voting using the internet as a form of e-voting.

**Natural Accident Theory:** System theorists argue that accidents in complex systems are inevitable because of the unanticipated way that errors occur and interact with one another.

**Open-Source:** In contrast to proprietary software, open-source software can be viewed, and improved on, by members of the public. Australia uses an open-source software approach for elections.

**Proprietary Software:** Software maintained by private vendors where members of the public are prohibited from viewing the underlying computer code. DRE systems in the U.S. use proprietary software.

**Residual Votes:** Votes lost because voters chose more than one candidate, created an unreadable ballot, or leave a blank ballot. The residual vote is the traditional measure of voting reliability.

**VVPAT:** Voter-verified paper audit trails are generated by printers attached to DREs. They provide a printed summary of the voter's choice which the voter can confirm before completing the voting process.

# Exploring E-Government Benefits and Success Factors



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## INTRODUCTION[1]

Over the last decade, information technologies (IT) have been considered one of the most influential ways to change organizations (Davenport, 1993; Ho, 2002; Laudon & Laudon, 2003). As early as 1986, Bozeman and Bretschneider suggested that different principles should be used when managing IT systems in public and private sector organizations (Bozeman & Bretschneider, 1986; Melitski, 2003). However, in a review of the literature, Rocheleau and Wu (2002) concluded that there remain a limited number of empirical studies that investigate whether there are differences between public and private sector organizations. Therefore, the research to-date about e-government is situated within multiple debates and draws from literature studying both public and private organizations.

In fact, there is also no clear consensus about the concept of electronic government. Descriptions are emerging. For example, Holden, Norris, and Fletcher (2003) reviewed the range of definitions other authors have proposed for e-government, and suggest there are some common elements. They mention

*e-government is or will become electronic and not paper based and may include the Web, e-mail, fax, telephone, or other electronic means of providing information and delivering services; available 24 hours per day, 7 days per week; and the provision of information and the delivery of services (of varying types and degrees of complexity and integration).* (p. 327)

## BACKGROUND

There is another debate in progress about the benefits and consequences of e-government among academics, practitioners, and within the populace. Historical evidence suggests that IT investments in government over the last couple of decades have increased significantly. Similarly, a growing body of literature continues to study the impact of IT investment and use on the performance of public organizations (Lee & Perry, 2002). However, some commentators believe that information technology, specifically electronic government, has not accomplished the promise of a more efficient, effective, decentralized and democratic public administration (Garson, 2004; Kramer & King, 2003).

Theoretically thus far, there have been two dominant approaches to understanding electronic government benefits and success factors. The first emphasizes the transformational power of information technologies and their impacts on organizational structures and outcomes. In this tradition, findings suggest clear and positive effects from using information technologies in organizational settings. A vast corpus of research is dedicated to identifying and analyzing these potential benefits (Dawes, 1996; Moon, 2002; OECD, 2003; O'Looney, 2002).

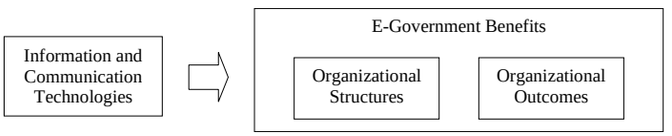
The second approach reflects on the impact of organizational, institutional, and contextual factors regarding the selection, design, and use of information technologies (Caffrey, 1998; Dawes & Pardo, 2002; Garson, 2003; Landsbergen & Wolken, 2001; Laudon, 1985; Pardo & Scholl, 2002). This academic tradition seeks to understand how different factors affect or shape the resulting information technology and subsequently, the resulting organizational outcomes as measures of IT success.

The first approach deals mainly with the impacts of IT on organizations and places emphasis on potential benefits (see Figure 1). The second perspective is more interested in identifying and analyzing different success factors and evaluating their importance for IT projects (see Figure 2). The two approaches are clearly related and complementary and important for understanding the e-government phenomenon (Gil-García, 2005). Both perspectives have contributed to our current understanding and the following sections present some of their main findings.

## BENEFITS OF E-GOVERNMENT INITIATIVES

Some authors note the tremendous positive impacts that information technology initiatives can have on govern-

*Figure 1. Characterizing e-government benefits (adapted from Gil-García, 2005)*




ment organizational structures and functions (Barrett & Greene, 2000; Brown & Brudney, 2003; O'Looney, 2002). Others suggest, "at least potentially, IT involves the transformation of the organizational culture of the government." (Schelin, 2003, p. 125). Another approach is Garson's decentralization-democratization theory where he states, "for democratization theorists, in the wake of the information revolution comes decentralization, because IT allows dramatic broadening of the span of control, and democratization, because knowledge, which is a critical basis of power, is also dispersed by IT." (Garson, 2000, p. 592).

## Benefits as Outcomes Only

Benefits from information technology initiatives can be seen as being only the final outcomes from their use. In this view, benefits such as service quality, efficiency, or effectiveness seem to derive directly and almost automatically from the use of information technologies in organizations. These benefits are considered "the reasons for embracing e-government as a means of reforming public management and contributing to broader policy objectives." (Ho, 2002; OECD, 2003, p. 28).

### Improvement of Service Quality

The goal of improving service quality was found in all the e-government policy statements examined in a recent international study (OECD, 2003). Customer-orientation is one of the most important ways in which governments have attempted to improve the quality of the services they provide to businesses and people. E-government initiatives have the potential to deliver better services. However, some problems of access diminish this potential (Garson, 2004). There are still some social groups that cannot enjoy the benefits of electronic services, or that cannot meaningfully obtain value from them (Mariscal, 2003; Norris, 2001; Warschauer, 2003).

### Efficiency and Cost Reduction

"ICT use in government has often been driven by the need to reduce the call on resources, either to reduce overall spending or to allocate funds to higher priority areas." (OECD, 2003, p. 29). Many of the e-government initiatives that are closely related to efficiency can be grouped in the e-management component of e-government. Most of the examples mentioned by the OECD (2003) fall in this efficiency category, such as payment processes, procurement, payroll, and human resources management. However, some initiatives that were considered cornerstones of the cost-savings promise such as e-procurement, have performed poorly or even been abandoned (Garson, 2004).

### Increased Policy Effectiveness

Policy effectiveness is a recently identified benefit of e-government. In the past, information technologies were mostly related to cost savings and service quality. However, "… there is an increasing awareness that e-government initiatives can also help achieve important outcomes in major policy areas such as health, education, anti-crime initiatives, and security" (Brown & Brudney, 2003; OECD, 2003, p. 37).

### Active Public Participation and Transparency

More in some countries than in others, e-government initiatives are also seen as promoting accountability and public participation. The relationship between governments and citizens involves many very important social and political factors. For instance, e-democracy initiatives do not refer only to online voting, but also to communication exchange between elected officials and citizens (Davis, Elin, & Reeher, 2002). However, electronic channels have been used by people who are not representative of the citizens' interests and politicians have noticed that these forums are not very helpful for their reelection purposes (Garson, 2004).

## Benefits as Organizational Structures and Outcomes

Potential benefits from the use of information technologies are not only final outcomes, but also transformations in the organizational structures and the interactions among

individuals in those organizations. According to Kraemer and Dedrick (1997), "the spread of computing technology has had a major impact on how work is done, how decisions are made, how organizations are structured, and how people interact." (p. 94).

In the literature, several benefits have been associated with information technology initiatives, such as increased productivity, improved decision-making, decentralization, reduced costs, increased revenues, and integrated services (Danziger & Kraemer, 1985; Roldán & Leal, 2003). Benefits of information technologies differ from organization to organization and according to the characteristics of specific initiatives. Dawes (1996) classified benefits in three different categories: technical, organizational, and political. These benefits are a combination of modifications to the current organizational and social structures as well as final outcomes.

## Technical Benefits

The use of information technologies may reduce duplicate data collection, processing, and storage and therefore reduce the heavy paperwork and data processing costs that attend every public program (Ambite, Arens, Bourne, Feiner, Gravano, Hattzivassiloglou, et al., 2002; Barrett & Greene, 2000; Caffrey, 1998). An IT initiative can also promote better standards and shared technical resources (Bozeman & Bretschneider, 1986; Dawes, 1996). System usability, reliability, and accessibility are some other well-known examples of technical benefits (Danziger & Kraemer, 1985; Gant, 2004). This technical quality normally requires additional changes in the organization, such as IT staff reorganization, IT training, and new formal channels of communication between IT staff and other members of the organization.

## Organizational Benefits

Organizational benefits are benefits related to the solution of organization-wide problems or the enhancement of inter-organizational capabilities (Dawes & Pardo, 2002; Gant, 2004; Lee, 2001). Improving the decision-making process, broadened professional networks, better coordination, high quality services, and cost reductions are some examples of organizational benefits (Andersen & Dawes, 1991; Kuan & Chau, 2001; Roldán & Leal, 2003). In the literature organizational benefits are treated separately but complementary to technological and political benefits (Stowers, 2004; Swiss, 2003). Most organizations need to modify their business processes, internal rules, channels of communication, and hierarchical structures, in order to obtain certain final outcomes from IT projects.

## Political Benefits

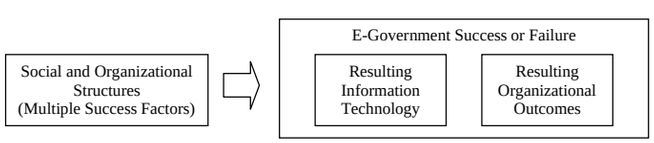
These benefits deal with broader public-interest areas. Better appreciation for government-wide policy goals, more public accountability, more comprehensive public information, and integrated planning and service delivery are some examples of this kind of benefit (Andersen & Dawes, 1991; Macintosh, Malina, & Farrell, 2002). In fact, "the development of computing technology has had an important impact on measuring accountability and presenting information to the public." (Rocheleau, 2003, p. 37). Political benefits can also be thought as individual benefits for public officials as a result of the use of certain technology characteristics or applications (Fountain, 2001; Kraemer, King, Dunkle, & Lane, 1989).

Understanding potential benefits is only one part of the research endeavor. Other scholars argue that benefits are not an immediate and direct consequence of information and communication technologies. Social and organizational structures interact with technological properties and the final outcomes (good or bad) are the result of these complex interactions. In the next section, research about different factors that affect information technologies is described and discussed in the context of e-government initiatives.

# FACTORS AFFECTING E-GOVERNMENT STRUCTURES AND OUTPUTS

As was mentioned earlier, there is important research about the impact of organizational, institutional, and contextual factors on the selection, design, and use of information technologies and resulting outcomes (see Figure 2). There is not a clear answer to the question of which factors are the most important in explaining IT success. However, different theoretical views have investigated different factors that are considered relevant to understanding information technology in organizations.

*Figure 2. Characterizing e-government success factors (adapted from Gil-García, 2005)*



## Contextual Factors

The context of organizations includes very important environmental factors. Some of the environment dimensions identified in the literature are (Hall, 2002, p. 204): (1) technological conditions, (2) legal conditions, (3) cultural conditions, (4) political conditions, (5) economic conditions, (6) demographic conditions, and (7) ecological conditions. Scholars in organizational theory have developed different ways to understand the impact of the environment on organizations as well as how organizations attempt to modify their environments (Scott, 1998).

In information systems, researchers have recognized the important role of environmental variables in shaping the way information technology is designed and used in organizations (Kuan & Chau, 2001; Laudon, 1985). Results indicate that some contextual factors such as personnel markets, competition, or politics may affect the results of IT initiatives (Bellamy, 2000; Bozeman & Bretschneider, 1986; Chengalur-Smith & Duchessi, 1999).

## Institutional Arrangements

Institutional factors constrain the way people act in organizational settings. "Institutions do not just constrain options: they establish the very criteria by which people discover their preferences." (Powell & DiMaggio, 1991, p. 11). Therefore, institutional arrangements are important elements in understanding how information technologies are selected, designed, implemented, and used in public organizations. Previous theoretical frameworks have used institutional theory to explain different aspects of information technologies such as adoption, implementation, and management (Bellamy & Taylor, 1996; Butler, 2003; Laudon, 1985).

Government organizations are usually created and operate by virtue of specific formal rules. In making any kind of decision, including decisions about IT projects, public managers must take into consideration a large number of laws and regulations (Dawes & Nelson, 1995; Harris, 2000; Landsbergen & Wolken, 2001). A one-year budget is common in many national and state governments and this type of budgeting affects the strategies and results of a long-term IT initiative (Dawes & Nelson, 1995; Dawes & Pardo, 2002; Fountain, 2001). Additional challenges are posed by the checks and balances system among the executive, legislative, and judicial branches (Bellamy, 2000; Harris, 2000; Rocheleau, 2003). The lack of incentives to collaborate across agencies can constrain IT projects that attempt to integrate or share information across multiple agencies (Caffrey, 1998; Dawes & Pardo, 2002; Fountain, 2001).

## Organizational Structures and Processes

Organizational factors relate to the organization as a whole and some characteristics of the implementation of IT initiatives. These factors can include the length of the project, understanding strategic goals, extent of change in business processes, project management approach, and lack of implementation guidelines (Chang, Gable, Smythe, & Timbrell, 2001; Davenport, 1993; Umble, Haft, & Umble, 2003). The size of the project and the diversity of the users or organizations involved are two important factors in IT initiatives (Barki, Rivard, & Talbot, 1993; Dawes & Pardo, 2002).

There are two other factors related to a project's goals and objectives. The first is the necessary alignment between organizational goals and the IT project (Andersen, Belardo, & Dawes, 1994; Dawes & Nelson, 1995). Second, Dawes & Pardo (2002) have identified the existence of multiple, and sometimes conflicting, goals in the public sector as an additional inter-organizational factor. Most organizations have multiple stakeholders and multiple goals (Hall, 2002). In fact, for some authors organizations are political entities with different groups competing for power and organizational control (Newman & Rosenberg, 1985; Pfeffer, 1992). Many e-government initiatives require the participation of various public organizations. Therefore, the multiplicity of stakeholders and goals is even greater and becomes a difficult challenge.

Finally, individual interests and associated behaviors can lead to resistance to change, internal conflicts, and turf issues (Barki et al., 1993; Barrett & Greene, 2000; Bellamy, 2000; Rocheleau, 2003). Different social actors have different perspectives about the impact of information technologies on their situation within the organization (Klein & Hirschheim, 1983). These contrasting views need to be understood in order to overcome resistance and conflict.

## Data Considerations

IT initiatives are designed to integrate, share, improve, or disseminate information. Several authors have focused their research on data quality and data accuracy issues (Ballou & Tayi, 1999; Redman, 1998). Information quality is very important but is often taken for granted (Brown, 2000). According to Redman (1998), data quality problems are caused by inaccuracies, inconsistencies, lack of timeliness, and incompleteness of data, among other factors. All these factors affect the overall quality of the information technology outcomes. In addition, the use of legacy data for decision support systems presents other challenges in the need for "soft" or judgmental data that is not

normally required for traditional systems and which quality needs to be evaluated (Tayi & Ballou, 1998).

In addition, mismatched data structures, incompatible database designs, and incongruous data and information distribution channels present problems in information sharing initiatives (Ambite et al., 2002; Barrett & Greene, 2000; Umble et al., 2003). Even when the involved organizations use the same kind of data, conflicting data definitions and different terminology will limit the extent of data and information sharing (Ambite et al., 2002; Dawes, 1996). Collaboration and associated information sharing are key aspects of e-government (Cresswell, Pardo, Thompson, Canestraro, Cook, Black, et al., 2002; Dawes & Pardo, 2002; Pardo, Cresswell, Zhang, & Thompson, 2001). Therefore, data-related problems need to be adequately addressed in order to obtain greater benefits.

### Technology Features

Technology incompatibility has been identified as one of the most important challenges to IT-intensive projects (Caffrey, 1998; Chang et al., 2001; Chengalur-Smith & Duchessi, 1999). Complexity and newness of technology are also constraints that can potentially affect the results of IT projects (Barki et al., 1993; Dawes & Nelson, 1995; Garson, 2003). Technology characteristics are very important for the success of IT initiatives in both private and public organizations.

Similar to projects in non-technology areas, human resources are very important. In the case of IT initiatives, the lack of technical skills has been discussed as an important factor in IT initiatives (Dawes & Pardo, 2002; Pavlichev, 2004; Schelin, 2004). The improvement of the design of an existing information system differs greatly from the development of a completely new system. These "legacy" systems present additional challenges (Kelly, Gibson, Holland, & Light, 1999). For example, Duchessi and Chengalur-Smith (1998) reported conversion of mainframe applications as one of the problems associated with implementing client/server technology.

## FUTURE TRENDS AND EMERGING APPROACHES

The two research directions discussed above have generated knowledge about information technology in government. However, e-government initiatives are continuing to increase in complexity and will require both a deep knowledge of the project itself and the environmental and organizational contexts in which it is embedded. Therefore, preliminary consensus continues to build around the idea that e-government problems are about both the complexity of the technology and the success factors related to organizational, behavioral, institutional, and cultural aspects (Caffrey, 1998; Dawes & Pardo, 2002; Fountain, 2001; Garson, 2003; Kraemer et al., 1989). It is suggested that much can be learned from observing these issues in different situational contexts. Comparative research and cross-cultural studies will be very useful toward this endeavor (Dawes & Préfontaine, 2003).

Additional research should also address the two gaps in the literature relevant to e-government success. The first, is conceptual, and is represented by the lack of accord among scholars and practitioners about the definition, characteristics, and benefits of electronic government (Gil-García & Luna-Reyes, 2003; Holden et al., 2003; Schelin, 2003). The second encompasses the lack of integration between the literature on IT success factors and the literature on electronic government and information technology in the public sector. Research in these areas should attempt to draw from both literatures to integrate findings and possibly achieve a better understanding of e-government benefits and success factors.

In addition, most of the academic work to this point has emphasized a linear view of the relationships between different success factors and information technology (Orlikowski & Iacono, 2001). Almost all the factors are hypothesized to have a direct and linear relationship with information technology success, regardless of direction. In current theoretical frameworks, few hypotheses have materialized about indirect effects and potential relationships between the different factors themselves (Fountain, 2001; Kraemer et al., 1989). Future research should hypothesize different relationships between factors, as well as direct and indirect effects on e-government success.

Lastly, emerging perspectives need to broaden the scope of government information technology. Prior research has had a somewhat narrow conception to this point. First, we need to understand e-government initiatives as not only technological artifacts, but also as the social relations around those artifacts including the interactions among social actors and between these actors and the technology (Dawes & Pardo, 2002; Kling & Schacchi, 1982; Orlikowski & Iacono, 2001). These studies should take into consideration elements other than the technology as fundamental to the e-government phenomenon.

Second, early studies reduced the complexity of IT and organizations; in essence, they took for granted the transformational power of information technologies (Kling, Rosenbaum, & Hert, 1998). Either information and communication technologies were seen to have the capability to radically transform organizational and institutional arrangements, or these organizational and institutional factors were seen to profoundly shape the design, implementation, and use of information technologies. Later research has

shown the recursive nature of the relationships between these two constructs (DeSanctis & Poole, 1994; Fountain, 2001; Kraemer et al., 1989; Orlikowski, 1992). Therefore, future research should address this complexity and bi-directional causality as inherent to e-government.

## CONCLUSION

Summarizing, research on e-government benefits and success factors can be greatly furthered in at least four different ways. First, integrating research results from studies about private and public organizations, different cultural and political contexts, and by acknowledging their differences but still taking advantage of the similarities. This is also a call for multi-disciplinary research (Dawes, Gregg, & Agouris, 2004). Second, recognizing the lack of consensus about the concept of e-government and develop clear and useful working definitions. Third, take a more comprehensive view of IT that includes technological artifacts, but also people, physical spaces, and social relationships. And fourth, understanding and including in theoretical models the dynamic and recursive nature of the relationship between social structures and information technologies. It will be the emergent research about these features of e-government benefits and success factors that will lead to both more comprehensive theories and powerful practical implications.

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## KEY TERMS

**Customer Orientation:** It is a service perspective in government adopted from the private sector, which suggests that citizens are customers of the government and service quality should be the main concern of government when interacting with them.

**Decentralization:** It is pushing down responsibility (i.e., decision-making, resource allocation, and control) of specific government functions (i.e., planning, management or service delivery) to lower levels of government.

**E-Democracy:** The use of information and communication technologies to increase citizen participation in public decision-making processes.

**E-Government Success Factors:** They are technical, organizational, institutional, and contextual factors that have an influence on the design, implementation, and use of e-government applications.

**E-Government:** It is the design, implementation, and use of information and communication technologies (ICTs) in government settings. Electronic government can also be understood as the selection, implementation, and use ICTs in government to provide public services, improve managerial effectiveness, and promote democratic values and mechanisms; e-government also creates a regulatory framework that facilitates information-intensive initiatives and fosters a knowledge society (Gil-García & Luna-Reyes, 2003, p. 107).

**E-Management:** The use of information technology to improve the management of government, from streamlining business processes to maintaining electronic records, to improving the flow and integration of information.

**E-Services:** The electronic delivery of government information, programs, and services often (but not exclusively) over the Internet including, e-commerce or the electronic exchange of money for goods and services.

**Institutional Arrangements:** They are formal and informal rules that exist in an organization's environment and potentially shape its structures and processes such as laws, regulations, norms, and policies.

**Organizational Structures:** They are formal and informal characteristics of the organizational or interorganizational setting in which an e-government initiative is embedded such as hierarchy, size, resources, relationships, and resistance to change.

**Transparency:** Relates to the openness of government toward exposing administrative processes and decision making, in addition to increasing information disclosure to citizens.

## ENDNOTE

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# Extending E–Government and Citizen Participation in Australia through the Internet

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## INTRODUCTION

This article seeks to provide a brief overview of the current development of digital democracy in Australia, with emphasis on the use of the Internet to extend and enhance citizen participation. Use of the Internet within the definition of digital democracy proposed is categorized into three overlapping groups: (1) e-government services and administration; (2) participatory technologies; and (3) informal modes of participation.

## BACKGROUND

The term "digital democracy" is comparable to virtual democracy, teledemocracy, e-democracy and cyber democracy. Following Kenneth L. Hacker and Jan van Dijk (2000), digital democracy "is the use of … ICT … and computer-mediated communication (CMC) in all kinds of media (e.g., the Internet, interactive broadcasting, and digital telephony) for purposes of enhancing political democracy or the participation of citizens in democratic communication" (p. 1). Digital democracy is defined by the use of electronic information and communications technologies (ICTs) to extend and/or enhance access to information, and facilitate participation in democratic communities, processes and institutions. Historically, this has included the use of radio, telephone, and televisual media, although during the last ten years, interest in digital democracy has shifted to focus on the use of the Internet.

Despite its comparatively small population of just over 20 million, Australia's political system has an elaborate structure consisting of local, state and federal levels of government which seek to democratically represent a culturally diverse and geographically dispersed constituency. Consequently, the use of ICT in governance offers particular benefits in the delivery of government information and services. As the following discussion illustrates, the potential benefits of digital democracy have tended to be recognized at state rather than federal levels of government and parliament.

In terms of Internet access, Australians have a relatively high rate of adoption, although according to at least one estimate, Australia's rate of overall technological access has declined in comparison to other developed nations.[1] By September 2003, more than a quarter of the population (5.2 million) subscribed to the Internet. At the time of writing, the vast majority of Australian users are dial-up subscribers, although this number as a proportion of total subscribers fell below 90% for the first time in 2003, corresponding to an increase in broadband uptake. According to the Australian Bureau of Statistics (ABS), there were over 650,000 broadband subscribers by the end of September 2003. From March to September 2003, Digital Subscriber Line (DSL) subscribers grew by 78% (163,000) (ABS, 2003).

### Government Services and Administration

E-government is the most visible dimension of digital democracy in Australia. The importance of developing Web-based technologies for e-governance has been recognized by virtually all states and territories in Australia (Trinitas, 2002). Initiatives, such as the Queensland government's *e-Democracy Policy Framework* and the Victorian Parliamentary Scrutiny of Acts and Regulations Committee's *Inquiry into Electronic Democracy*, reflect the growing significance of e-governance in enhancing and extending government information networks and administration of services (Parliament of Victoria, 2004).

Email and databases are now used to coordinate organizational activity, daily government and parliamentary work (Gibson, Ward, Römmele, 2004; Grönlund, 2002). Australian citizens have greater access to information and services, ranging from information about taxation to electoral rules, as well as greater access to observe the activities of democratic representatives via the Internet. The Australian Broadcasting Corporation began audio-streaming a Parliamentary and News Network via its Web site in 1998 (Magarey, 1999). Federal parliament has audio-visually Webcast (otherwise referred to as "netcast") its parliamentary sessions and committee hearings for

over four years. By 2003, the Australian federal parliament and certain committee activities were Webcast via several simultaneous channels and attracted around 15,000 hits per week during parliamentary sessions (although viewers tended to consist of lobbyists, the media, and public servants) (Parliament of Victoria, 2002c; Adams, 2003). At the state level, Queensland Parliament has also offered limited audio Webcast services (Queensland Parliament, 2004).

It is at the local government level at which Webcasting perhaps offers the most benefit. Some municipal governments in Victoria and New South Wales have streamed council meetings to provide greater opportunity for community involvement in local government by enabling open access from home, as well as promoting a sense of transparency to council meetings. Citizens watch issues of direct interest to them, such as council discussions about pollution levels in their municipality, or for general educative purposes.

Some Webcasts offer viewers the opportunity to interact directly with representatives. Webcast facilities for council meetings in the Wellington Shire of Victoria, for example, include a chat function through which interested people can pose questions at the end of each meeting. Watching an unedited Webcast also has the advantage over reading a transcript of enabling the viewer to experience the tone and bearing of Members of Parliament (MPs) "live" (Adams, 2003). The capacity of electronic media, such as the Web, to enable greater opportunities for interaction with government and broader political participation is a second, albeit underutilized, dimension of digital democracy in Australia.

## Use of the Internet to Extend Participation and Citizenship

This second category of digital democracy includes a range of electronically-mediated activities in which individuals, groups and organizations are able to *formally* interact in determining the conditions of their political association. Opportunities to vote electronically (e-voting), engage policy development and debate online are examples of this; but note that I use the adverb "formally" to distinguish legitimate modes of participation from informal activities, such as Hacktivism, which are described in the following paragraphs in further detail as a third category of activity.

Use of the Internet to formally extend the scope and capacity for participation is distinguished from the provision of government information and services by adding the element of interactive communication. Van Dijk provides four categories of interactive communication: allocution (e.g., computerized election campaigns, civil service, and information centers); consultation (e.g., Web-based public information); registration (e.g., telepolling or televoting, electronic referenda, and elections) and conversation (e.g., e-mail, bulletin boards, electronic town halls, and discussions) (van Dijk, in Hacker & van Dijk, 2000, p. 40).

The benefits of electronic technology have been recognized by the Victorian Parliament as enabling individuals to engage policy development through improved access to relevant information, more effective methods for the distribution of materials and proposals, and tools for greater collaboration, consensus formation and deliberation free from the constraints of time and space (Parliament of Victoria, 2002a, 2002b, 2002c, 2002d, 2002e). The New South Wales government, for example, sponsors a "Community Builders" network of policy implementation, in which an interactive electronic clearing house is available for community level social, economic and environmental renewal (New South Wales Government, 2005). The Queensland Government has established an e-democracy unit responsible for implementing and managing the government's three e-democracy initiatives to test how information technology can enhance the community's access to government and participation in government decision-making through online community consultation, broadcast of parliament and e-petitions. The *Citizenscape* Web site of Western Australia promotes active participation in involvement in decision-making and informs about citizenship related activities (Department of the Premier and Cabinet Western Australia, 2005).

Electronic networking has also been used to foster community participation to a limited extent at a Federal level. Magarey (1999) provides the example that during a Federal Parliamentary debate on Native Title (concerning the recognition in Australian law that Indigenous people had a system of law and ownership of their lands prior to European settlement):

> *One of the benefits a parliamentary democracy may offer is the possibility that its processes of deliberation may build community and engender civic involvement ... Internet technology arguably contributed to a fulfillment of these broader aspirations for Australian democracy.* (p. 64)

Political parties in Australia increasingly use the Internet to connect with their members, other groups, individuals and other parties. But while political parties appear to be using the Internet to some advantage to build "quite varied and large Web networks around themselves", recent research suggests that they "do more to reach the outside world than it does to reach them" (Ackland & Gibson, 2004, p. 29-30).

Historically, politicians have been reluctant to use ICT to seek greater input into policy development, although data on current trends is difficult to obtain. One study of the Internet and Australian Parliamentary democracy during the late 1990s found that many Parliamentarians did not tend to use the technology to seek public input in the process of policy formation, exhibiting a strong awareness of the limited nature of the audience of new media. Only a few parliamentarians had their own Web pages and negatively associated new media with increased workload. E-mail was not regarded as an "official" medium in the way that hard-copy was; nevertheless, it was perceived as allowing different voices to be heard (Magarey, 1999, p. 58). This attitude may be changing as legislation increasingly recognizes transactions conducted by e-mail (Parliament of Victoria, 2002f).

Electronic voting, "e-voting," is another area in which Australia has yet to develop in a substantial way (Barry, Dacey, Pickering, & Evans, 2002, p. 20). Australia has yet to practically explore anything like the scale of the electronic voting machines used during the 2004 general elections in India (ECI, 2004; Haidar, 2004), nor the complexity of local UK government trials of several different e-voting systems. For example, Liverpool and Sheffield local councils trialed an integrated system of electronic voting and electronic counting of votes during 2002 elections, through which votes were lodged via telephone, Internet, electronic kiosk, mobile phone (SMS) alongside conventional polling stations and post (Barry et al., 2002, p. 5).

While e-voting may be promoted as a means of encouraging greater participation in non-compulsory voting jurisdictions, evidence of this practice is debatable and may not be as relevant to Australia, in which voting is compulsory. While there have been some encouraging uses of the new technology to increase voter participation, such as Done's study of the use of Internet voting in the 2000 Arizona Democratic presidential primary elections (Done, 2003, p. 261), recent studies of e-voting in the UK indicated that providing the facilities to e-vote did not substantially increase voter participation (LGA, 2002, p. 4).

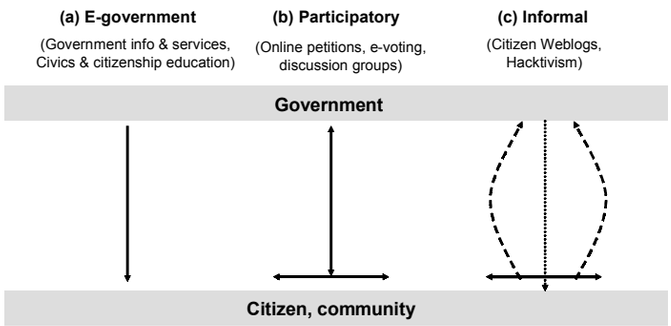
## Informal Participation

A third type of democratic activity concerns informal channels of communication and activism taken using ICT. Examples of these include forms of citizen Weblogging and Hacktivism. Citizen-generated Weblogs reflect a relatively minor but no less significant outlet for individual expression, in which citizens use the Internet as an open forum to express and share their opinions of Australian politics. Australian politicians have also not made use of Weblogs ("blogs") in the ways that politicians such as 2004 U.S. Presidential candidate John Kerry have.

Hacktivism is a more controversial but important dimension of digital democracy. Contrary to their representation in popular media, hackers promote: technical proficiency; a mistrust of authority; that there should be unlimited access to computers; and a firm belief that computers can improve human lives. More importantly, they promote the idea that all information should be free (Levy, 1994). Hackers believe that "information-sharing is a powerful, positive good, and that it is an ethical duty of hackers to share their expertise by writing free software and facilitating access to information and to computing resources wherever possible" ("Jargon File", cited in Himanen, Torvalds, & Castells, 2001, p. vii). "Hacktivism" refers to the combination of hacking and public activism in a deliberate and usually political way. Hacktivism is about freedom of information and freedom of movement in cyberspace. Civil disobedience and protest are important political tools of Hacktivists, who achieved a high level of visibility during the 1990s throughout the world, ranging from attacks on the Chinese government, to NATO's action in Kosovo (Hopper, 1999). There is evidence to suggest that the infamous WANK worm, which in 1989 confronted NASA scientists with the banner: "Worms against nuclear killers," emanated from Australia (Denning, 2004; New York Times, 1999). Some of the first "high-profile" hackers were based in Australia. For example, a loosely formed group known as "The Realm" were responsible for invading several high-profile computer systems in Australia and the U.S. during the 1980s and 1990s. But their largely a-political activities could not be classified as "hacktivist" per se; in fact, their attacks were responsible for the creation of Australia's first federal cyber-crime legislation in 1989 under pressure from the U.S. Government (Anderson, 2003; Dreyfus, 1997).

These informal activities of digital democracy are important because they are concerned with the *control* of information—often in response to the forms of e-government described above. Activities in this area reflect the capacity of technologically proficient individuals and groups to de-center power away from institutionalized forms of democratic dialogue (i.e., through legitimized government channels) and conventional commercial broadcast media, to the micro-level of individual and/or small group behavior. Hacktivism explicitly promotes the decentralization of authority (Levy, 1994). This type of informal political activity is significant because the participants, be they blogger, hacker, and so forth, use the technology for non-institutionalized forms of power; or at the very least, they operate at the margins of institutionalized power, challenging it in both positive and negative ways. But there are two aspects of these informal modes of digital democracy that need to be

*Illustration 1. Basic typology of activities in digital democracy*




acknowledged: firstly, Hacktivism is only one form of online activism and while it is not in itself constitutive of the diversity of networks, organizations and activism that constitute online civil society, it highlights both the importance of collective knowledge sharing and the shifting dynamic of power inherent to new knowledge networks.

A second important issue here is that of *responsibility*. Hacktivists have been criticized for "hiding beyond anonymity or pseudonymity" and not taking direct responsibility for their actions (Fowler, quoted in Hopper, 1999). Furthermore, the distinction between hacker and hacktivist is not always clear. This issue of responsibility challenges whether these informal modes of participation ought to be recognized as "democratic." The blogger, too, is often anonymous and the agenda of Weblogs is often not transparent. It has been observed that while U.S. politicians use Weblogs to promote accountability, this medium may encourage greater use of "spin" (Adams, 2003).

The three overlapping categories of digital democracy described above are summarized in Illustration 1.

Illustration 1 provides a basic summary of the three kinds of activity in the area of digital democracy described above in terms of the types of interactions occurring between government and citizenry. The vertical arrows show the "top-down" and interactive flow of communications between government and the citizenry. The horizontal arrows at the bottom depict communications between citizens and communities. Model (a) "E-government" depicts an essentially top-down approach to the delivery of information and services. Examples of this include information about taxation and civics education. Model (b), "Participatory technologies," shows that interaction is enabled between government and citizenry, as well as between citizens themselves, such as through online policy consultancy or community discussion forums. Model (c) "Informal" illustrates how independent agents, such as hackers and bloggers, bypass formal government channels while seeking to influence decision-making. The curved upwards arrows depict the bypassing of formal government lines of communication and information by independent agents, such as hackers, who seek to influence government decision-making and/or de-center power away from government and other loci of information control.

## FUTURE TRENDS

A significant challenge to the technological enhancement and extension of democratic participation emerges from Australia's distinctive political history. As one of the earliest countries to abolish property qualifications for voting, give women the right to vote and stand for parliament, introduce a universal franchise and hold secret ballots, Australia has an impressive record of democratic innovation and social progress (SLCRC, 1995). Despite this, Australian parliamentary democracy during the latter twentieth century is characterized by a conservatism consistent with Magarey's (1999) study of parliamentarians' attitudes to Web-based technologies described above. She rightly intimates that there is a connection between the lack of "in-depth research into e-democracy," and the poor reception of various efforts to instigate direct democracy in Australia (p. 42).

Efforts to introduce forms of direct democracy to revitalize the popular sovereign (such as Citizens' Initiated Referenda) have been rejected on a number of occasions at both State/Territory and Federal Levels (Davidson, 1997; Walker, 1993). As Davidson (1997) argues, "When we turn to consider international "best practice" concerning direct democracy, Australia continues to lag well behind. The introduction of direct democracy has so far been rejected … despite observations that indicate how particularly apt the technological advance

of information highways make such notions in Australia". The potential role of technology has been absent from debates of the revivification of Australian democracy (pp. 237-240).

The development of digital democracy in Australia will need to move beyond debates in the literature and mass media that equate digital democracy with direct democracy, to "a subtle and complex fusing of elements of direct democracy and new ways of representation" (Hacker & van Dijk, 2000, p. 3). It is interesting to note projects such as the Democracy Project in Denmark and recent digital television experiments of the UK have been developed in response to poor voter turn-outs at elections and a perceived general apathy of citizens (Trinitas, 2002). Similarly, in Australia, research during the last decade has indicated an increasing sense of civic deficit, personal alienation, powerlessness and a declining feeling of community amongst its citizens (Civics Expert Group, 1994; SLCRC, 1995; Walsh & Salvaris, 1998). As the capacity to generate and electronically disseminate information in Australia may be comparable to international best practice, so too is the experience of representative democracy consistent with an "increasing disenchantment on the part of citizens towards many of the institutions and procedures of democracy" observed elsewhere, such as the United Kingdom (Coleman, Taylor & van de Donk, 1999, p. 4). Digital democracy is not only about exploring new processes of governance and formal participation; it is also about how the technology can be used to address attendant problems arising in the politically subjective dimensions of democratic citizenship, in which knowledgeable citizens should as a matter of principle be equipped to participate in the exercise of democratic rights and responsibilities. Beyond merely having access to information, it is necessary for citizens to have access to the skills and resources to be able to use the technology in an informed and effective way to build and enhance sustainable democracy communities. Much of the current interest in digital democracy, however, is largely to do with saving time, increasing accuracy and accessibility in the administration and provision of government services. While an informed citizen is a positive step to revitalizing democracy, an informed and *participating* citizen is a far better measure of democratic well-being.

## CONCLUSION

The recent history of Australian parliamentary democracy is one characterized by conservatism (both in the use of new technology and otherwise), despite Australia's history of democratic innovation. Of the three categories of activity described in this chapter, Australia is most developed in the first area of e-government. In international terms, however, Australia lags behind in other areas. In her study of parliamentarians use of the Internet during the 1990s, Magarey concluded that "there is certainly no Internet revolution in Australian politics at the moment" (1999, p. 58), and there is little suggest that much has changed since in practical terms.

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## KEY TERMS

**Broadband:** Defined as "an 'always on' Internet connection with an access speed equal to or greater than 256kbps" (ABS, 2003).

**Digital Democracy:** Encompasses the use of ICT and computer-mediated communication, such as the Internet, interactive broadcasting and digital telephony, "for purposes of enhancing political democracy or the participation of citizens in democratic communication" (Hacker & van Dijk, 2000, p.1).

**Electronic Voting:** Or "e-voting" is defined as "Any system where the elector casts their vote using an online system, such as the Internet, touch-tone phone voting using interactive voice recognition, mobile telephone SMS text facility, or interactive digital television. Once recorded, the elector's vote is dispatched in real time to a secure electronic vote store, where it is held prior to counting" (Barry et al., 2002, p. 3).

**Webcasting:** Or "netcasting" is an audio-visual transmission that is streamed via the Internet. This transmission may be streamed live, or recorded for later access on the Internet.

**Weblog:** Or "blog" is a form of online diary that is entered and made accessible via the Web.

## ENDNOTE

[1] International Telecommunications Union, cited in Muir, 2004, p. 5.

# Facing the E-Government Challenges within Catalonia

F

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## INTRODUCTION

During the 2001-2004 period the main pursuit by the AOC (Administració Oberta de Catalunya or Open Administration of Catalonia) was to create a well defined setup and devoloped CAT365 portal, the citizen's portal[1]. This portal would offer a new space on the Internet (as a complement of presencial and phone channels) through the creation of a brand new CAT 365 which belonged to everybody, but without being associated with any administration in particular. This portal would allow the user to reach the required information and to do transactions online. This could be done in an integrated way and within the user's own scope through an organisation based on natural sets (life events) and without relation to the current competencial organisation.

This model legitimated by the Parlamentarial Pact was signed and agreed in summer 2001 by all the parlamentarial political parties in Catalonia, together with the local public administrations and with the Generalitat of Catalonia (the Autonomous Catalan Administration). In Autumm 2004 it reached a crisis point and, therefore, it was reviewed.

## BACKGROUND

During a certain stage of development of e-government there has been and there still is the paradigm of creating a portal where one can concentrate all the information, interactions, and procedures of any public administration, a single portal which can act as a distributor of public services, and one where the citizens can easily find the services they need independently of the administration that finally offers the service. This is a model where the division of the roles of service provider and service distributor takes place: the role of provision is played by the administration which owns and delivers the service and allows a third party to distribute these services. This has been the model adopted by the Catalan public administrations in the AOC project where within the setting of the AOC consortium a public entity has been created with the participation of the autonomic administration (Generalitat de Catalunya) and the local administration (via Localret, the consortium of local bodies for the Information Society) with the aim of using telematic channels, mainly internet and telephone, to distribute the services of the Catalan public administrations. This model reached a crisis point and therefore it was reviewed. I think it was an impeccable model from a conceptual view. The problem was that at that moment the model did not fit with the Catalan Administration's situation. My opinion is that we have been going through a development of the initial model is not a replacement by a new one. Most of the objectives of this latest model were already in the initial one; in fact, there is a nuance and a strength difference between both models but not in their chief meaning. To understand deeply the reasons why the AOC1 did not achieve success I would recommend reading the article written by M. Sanromà, "Digital Administration: A New Way to Manage Public Administration Information".

The aim of this article is to explain the principal characteristics of the new model through some of the products that have been developed and are being developed within the AOC setting. The mission of the AOC project is the same: improving the relationship between the Catalan public administrations and their citizens, companies and entities, but the project is currently accentuating the development of solutions that increase interadministrative collaboration and allow the procedures to be simplified or eliminated, such as the integration of information on public services—in an early stage—in order to integrate the procedure at a later stage. The idea underlying this strategy is that in order to improve the relationships between administrations and citizens, a parallel improvement in relationships between administrations must take place. To this end the AOC project is developing solutions (some of which are described here) with an ASP[2] philosophy. In this way all the different Catalan public administrations will have access to the solutions necessary so that any of them may move towards e-government without any individual administration having to develop solutions on its own, thus producing clear savings due to economies of scale. Among these solutions we find the modules known as common or corporate modules: electronic registration of incoming and outgoing correspondence, a notice and warning platform via e-mail or SMS, and the notification module. These are only some of many examples.

Although we are aware of the need to use tools which could simplify and improve the relations within Catalan administrations, the AOC is currently providing solutions which allow sharing communication and doing transactions online among them. Its aims are as follows:

- The Consortium AOC is changing the model from a "front-office" integration to a "back-office" integration approach.
- The business focus will be on horizontal e-services across different governmental agencies.
- Web services and data integration is the keystone of a new Integration Architecture.
- An interoperability framework and common metadata models will be defined.
- The impact on the activity of the Consortium AOC will be measured on internal efficiency and cost optimisation.
- The Consortium AOC must provide safeguards around the sharing of people's information among government agencies.
- There will be collaboration of private sector i key (i.e., change of adress, e-invoicing, etc.).

## THE VISION OF THE ADMINISTRATION AND THAT OF THE CITIZENS

The reality and the behaviour of people and organisations fit better with a network model than a hierarchy. Despite this generalised statement, in the field of public administration its history has over a long period of time shaped some hierarchical organisations, oriented towards a vertical management of its competences. It is true that in the latest decades some concepts such as transversality have been introduced in the work of the administration, but it is also true that in the majority of cases it tries to respond to problems generated by the lack of a strategic vision which derives from the verticalisation of administrative management. The benefits of its application have not gone beyond the sphere of the administration itself and have not extended to cover its necessary relations with other levels of administration.

We find ourselves then, on one side, with an administration that functions as a perfectly organised whole where every territorial administration counts on some perfectly defined and fixed competences, with a complex organisation but one organised through hierarchies of power and which seem to be inspired by those perfect and pure Hegelian views of the world where everything works like a well-oiled watch. The main aim of this whole is to administrate, manage the public resources, and offer services to the citizens in the most effective and efficient way. On the other side we find ourselves with the citizen, lately referred to as a "client" (since the traditional techniques and strategies of the private sector moved into the public sector) who, in sum, are users and consumers of public services who feel overwhelmed when facing the administration. They do not understand it but frequently have to put up with it. They are conscious that they have to deal with it from time to time, but they think that the less frequently, the better.

## SOME EXAMPLES AND SOLUTIONS

In Catalonia (and in Spain) there are three coexisting levels of administration, each with important competences: the local, autonomic and central administrations. The current legal code fixes the spheres of activity for each of them; therefore, we are looking at a scene which is perfectly established and fitting from the administrative and legal point of view, but not from the citizen's point of view. The citizen is often a victim of competential distribution which is illogical in terms of access. It is simply impossible to understand. Furthermore, the distribution of competences between the different administrations is unstable; therefore, the perception of the citizen when it comes to choosing a service to cover a need is, to say the least, one of disorientation.

In the real world each administration has a list of competences that it should carry out, a territorial sphere of activity, and the resources to carry out its aims. Consequently, each administration has in recent years been developing solutions, with different degrees of sophistication and efficiency, in areas of e-government service provision to its citizens.

Traditionally the different administrations have been distributing their services through the new channels that the new technologies of information and communication allowed, focusing on those spheres of activity where they had competencies, as was logical. For each administration the citizen (understood in a broader sense to include companies and entities) was "its" citizen. Each administration tried to improve its services using new channels to deal with its citizens but limited its sphere of activities to the strictly defined space of its competences. The result of this commendable effort was the reproduction, now in a digital environment, of the citizen's perception of fragmentation in the supply of public services.

There are many procedures which are located in the sphere of activity of a single administration. The complete process starts and ends in organisms depending on the same administration. Nevertheless, on numerous occasions the citizen will have to show particular attributes

(for example, residence in a particular municipality; possession of a particular level of education), by presenting certificates that are frequently issued by other administrations. Similarly, the citizen in his everyday life faces particular situations where the complexity and extension of the process, the competential distribution or a fragmented supply forces him to deal with different administrations in order to satisfy a single need. In these cases, and given the fragmentation mentioned earlier, the citizen does not have a global, integrated vision of all the processes necessary in the different administrative levels.

Among the clearest examples of the necessity to deal with different administrations are, without a doubt, the case of the birth of a child and the complex process of setting up a business.

Let us analyse the present situation of the first example: what are the present steps that a family in Catalonia is obliged to take after the birth of a child?

- In the ambit of the general administration of the state, parents must sign up the newly born child with the Civil Register through the registration in the Family Book; furthermore, if the mother is working, she must sign off Social Security.
- In the ambit of the Generalitat de Catalunya, the family must sign on with the health register managed by CatSalut (a public body of the Health Department) and, in the case of the third child, request recognition as a large family as issued by the Department of Social Welfare and Family Affairs.
- In the local ambit, the family must register the child in the corresponding municipal census.

On the other hand, the different administrations, aware of the fall in the birth rate in our country over the last decades, offer a set of actions aimed at fostering and favouring the increase in the number of children per family. Therefore the Catalan family has the following help available:

- The general administration of the state, via the Inland Revenue Service, offers the sum of 100 • a month if the mother is employed.
- The Generalitat de Catalunya, for its part, through its Department of Social Welfare and Family Affairs, offers benefits of 550 • annually to families with children under the age of three (and 625 • in the case of a single parent family or a large family).
- Similarly, numerous Catalan town halls apply discounts and rate reductions to water consumption and property, among others.

We have summarised here a reality which is repeated thousands of time each year in order to detect the diversity of procedures involved in a unique act. The complexity increases even more if we introduce new factors (which will not be mentioned in detail for lack of space): particular actions should be carried out before others. For example, to register the birth of a child one must previously have registered the birth in the Family Book. Similarly, each procedure requires specific documentation. On occasions, even the same documentation will be requested by different administrations.

This simple example, in my opinion, shows that an action orientated towards easing the relationship of the administrations with the citizens should allow a simplification in the procedures and documentation required and in the coordination between different administrations. Continuing with the example of the birth of a child, the ideal thing would be for all the procedures deriving from the birth to become unified and, based on the information required (number of children, if the mother is employed, family's municipality of residence), the necessary procedures would be identified and the processing could begin. This would allow the integrated handling of the different processes that should be complemented by the possibility that, if the family agrees, each administration could access the information it requires from other administrations, thus avoiding the need for citizens to present additional certificates.

Actually, there is an even higher standard of excellence: given that the administration has sufficient mechanisms to be informed of the new birth, the optimum situation would be that, without carrying out any action, and acting on its own initiative via an internal mechanism of the administration, all the information required in the Civil Register, Health Register, municipal census, etc. would be automatically updated, such as the aid and assistance to which all families have a right if they meet certain requirements. And this is not science fiction. In some countries this is already a reality (I recommend visiting the Irish government's Reach project, at http://www.reach.ie/).

## HOME COMMUNICATION SERVICE

Since more than a year ago there has been a project whose aim is to develop an integrated service between the three administrative levels: this is the home communication service.[3]

The European Union has been pushing different initiatives dedicated to using the ICTs in managing the services of the administrations:

The eEUROPE initiative; the eEUROPE 2002 Plan, of June 2002 which approved a list of 20 basic public services (12 for citizens and 8 for companies) and the eEUROPE 2005 Plan presented in the European Council

in Seville, centred on security of the network and of the information, electronic administration, electronic learning, e-health and e-commerce.

The telematic home communication service is one of these 20 basic services identified in the list of public services of the Electronic Administration. The service is in keeping with the idea of the relations of the citizen with the different public administrations, and in all levels of the state administration being involved in service provision.

The home communication service is a multi-administration service, simple in conception but complex owing to the number of public service providers involved, and one which requires effective communication between all the participating actors. The solution, designed in a telematic setting, hides the complexity of this relationship with the citizen, making the service sphere not so much territorial as virtual, with the same service accessible from various points of the network. To offer this kind of service it is necessary for the different administrative bodies to be interconnected and interoperable and that the service is designed to function in a collaborative way. In Catalonia, we calculate that each year approximately 10% (650,000 inhabitants) of the population change their residence, showing that we are dealing with a service with enough critical mass for the different administrations to give the service high priority.

The aim of this project is to establish an Internet service through which citizens may simultaneously provide details about their new address to the different organisms and entities of the public administrations involved and carry out all the procedures with a single access.

This provision of information will lead to an updating of the details of the home in the appropriate administrative units and in turn to the start of the administrative procedures to renovate personal documents (such as the health card or the National Identity Card). The administration may be proactive in the sense that when a change of address implies the start of a procedure, the administration will be able to send a new document (in the case of a health card) or inform the citizen of the start of the renovation procedure (in the case of a driving licence).

The service avoids citizens having, on the one hand, to request the municipal census document, as it is enough that they agree to their details being transmitted to the selected organisms, and on the other hand, to avoid going in person to the appropriate organism. This brings clear benefits to the citizen—who stops wasting time, and therefore money—but also to the administration, as it is calculated that approximately 50% of the activity carried out in the personal attention centres of the Catalan administrations is related to the issuing of certificates originating in a request for a service for those citizens in another administration.

The project considers all the obligatory legal and administrative aspects of dealing with a public service with information which is confidential and protected by the Basic Law of Personal Data Protection. Special attention has also been paid to the aspects of legal and informational security in order to reach the applicable guarantees.

In the same way as in the cases described of particular situations of having a child and changing residence, there are other cases in which the citizen is able to describe a need (I want help to get a home, or I want to set up a business), but, nevertheless, does not know the distribution of competences between different administrations. In any case the idea behind the integration of information and procedures is the development of a new integrated service in which responding to a series of questions sets off a logical process that:

- Identifies the procedures which are related to the situation
- Presents a single form, which avoids repeated handing in of the same information
- Sends the corresponding electronic application to all administrations involved
- Helps identify the state of progress of all the procedures which are under way

The resulting product will not be offered to the citizen from a single access point, but quite the contrary: access is available from any administration involved in the global process. In this way we have evolved from a model based on the idea of concentrating on one single access point (one-stop portal, single window service) to a network-based model where the citizen chooses the service access point. We believe firmly that this is the way to achieve interadministrative transversality, so far unknown in our country.

## ADMINISTRATIONS BROWSER

The same philosophy underlies another of the emblematic products in this new concept of e-government: the public administrations browser.

In the ambit of both private public sector initiatives the wide diversity in the ways of structuring the digital contents of Web pages means that the browser is one of the most frequently used tools. This should allow rapid and direct access to the contents that the user is seeking, regardless of the taxonomy used by each indexed Web page.

The great diversity of Webs and public contents has lead to browsers becoming fundamental tools for access to interesting resources. Our experience shows us that

one of the resources most utilised in public sector Webs is the browser that the great majority of these Webs have, given that it is preferable to try to access interesting contents through this rather than trying to surf the Web on a site that could be organised around criteria that need not necessarily correspond with the user's method of surfing, nor with the user's experience of net surfing.

Despite this, the level of quality of the different browsers on public Web sites is, in general, fairly inadequate.

Based on this reasoning, the AOC project has been working for some months on a Google-style browser that allows one to:

- Index all pages published by those public organisms active in Catalonia
- Index not only html format documents but also databases, Excel files, pdf, and so forth
- Index on a daily basis
- Associate weighting criteria (page rank) with the result in order to prioritise the presentation of the most valuable contents
- Present the contents by type: procedures, information and features
- Incorporate linguistic tools which allow improvements in the quality of the browsing (categorisers, dictionaries of synonyms, etc.)
- Offer to include the product in the Web page of any administration that wishes to become involved

This is a search service designed to meet public-service search requirements, allowing equipping of public sites with a search engine that knows where to find the key information sources independently of where they are located. The solution includes a fast and scalable indexing spider, which indexes any content from any Public Administration site. This feature allows any Web site using the administrations browser to be a gateway for information across multiple sites without losing the identity of each site.

It does not impose any requirements for content change across the sites that you own or those that are spidered. Whether you deliver content from a database, content management system, portal system or static pages, the search solution will enable you to provide a consistent search across the whole lot.

The benefits of an Internet contents browser such as this are, I believe, clear. Firstly, the construction of a powerful browser that integrates all the information available on the Web in such a way that the citizen who is searching for a particular service and who knows neither the administration that offers it, nor if there are any complementary services adequate to his needs, can have direct access to the global result.

Secondly, it is a service available to all the administrations via the Google-type toolbar, so that the citizen can have access to an integrated vision of on-line public services from the Web of the administration he wishes to use. This solution has been offered free to the Catalan public administrations and it has been already requested by more than 160 municipalities and local authorities who will add it to their Web site in January 2006.[4]

It indexes the public contents of three different administration levels (local, regional, and national) and gives the citizen a global vision of all three administrations services with one unique query without knowing which specific administration offers the service being looked for, because this global search engine accesses all the public contents independently of the administration which offers the service.

There are also some spin-off products of this browser that may be of interest, such as the extraction and "packeting" of contents. In this sense we are working on:

- A directory of public assistance which allows access to the complete range of promotional actions of any public administration, of whatever type: subsidy, grant, discount, economic loan, and so forth
- A directory of public employment opportunities allowing access to all the posts available from any administration
- A directory of the public housing opportunities in the different administrations
- A directory of training opportunities allowing access to information on both regulated- and non-regulated training, and which is directed at specific collectives (occupational training, adult training, etc.)

In summary, what is proposed is a catalogue of products allowing simplification in citizens' access and procedural handling of the public services in an integrated way. These are accessible from different Web pages due to their "non-branded" nature and that additionally generate internal benefits in the administrations providing the services. We believe that the following steps in the—let us not forget—still young life of e-government should move in this direction. If it turns out not to be so, we hope we are agile enough to realise it and make amends.

## CONCLUSION

From the experience we have got during this last five years when the AOC project was born, we have learnt that flexibility to adapt to new and changable situations is

completely necessary to reach an e-government project successfully.

The current situation shows us that all e-government projects are in a changable scenario due to, at least, two factors: the first one is the huge dependence on the latest technologies (and nobody knows where they would take us). The second factor is that the organisations we are working with—the administrations—are subject to the possibility of change (each time that the elections take place). And we have to add to this situation the necessary collaboration among other administrations which would also be subjected to changes caused by elections. This last subject is the responsable—that is, when the interoperability is necessary—of not complying with the timing and milestones planned since the needs, the rates and the priorities would be different for each administration level.

I think the evolution suffered by the AOC project in Catalonia is well focused since we have been able to adapt it to the administration necessities mainly not to provide front-offices solutions. Therefore, we have been working towards a redefinition of the project underlining the outstanding tasks on the back-offices and the interoperability needs. This leads to a reduction of the front-offices solutions, a field where the Catalan public administrations have been working themselves for a long time.

This new direction has been possible in Catalonia because there is a general agreement about the guidelines to be followed. The 2001 political agreement illustrates a will to work together on this joint project among the two closest administrations to the citizens: the local and the autonomous. This is the main reason which has allowed us to readjust the project, without having any risk caused by the recent political changes on the Catalan public administrations scenario. Therefore, it has been possible to save some of the initial elements, while others have been modified and new ones have been created.

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## KEY TERM

**Interoperability:** Interoperability means the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge. (http://europa.eu.int/idabc/servlets/Doc?id=19528)

The AOC basic principles of interoperability among governments are:

- Makes sharing of information and intergovernmental cooperation possible
- The information source is owned by the area of political competence that governs its use
- The corporate systems are independent and separate, although certain functional tasks are shared
- Process flow and exchange of electronic information
  - Each administration can provide or request data
  - Exchange of information may be initiated:
    - By the administration requesting the information
    - By the administration in possession of the new information
    - By the institution managing the electronic information exchange network
  - This exchange may become totally automated (application relationship) or may require manual intervention
- Shared open standards
- Common across-the-board services
  - Transaction services
  - Security services
  - Content management and incorporation services
- Standardisation of data and procedures
- Promotion/encouragement of working together
- Possibility of common platforms

## ENDNOTES

1 To see the aims of CAT365, Marsal, Sanromà, and Albors (2004)

2 Application Service Provider

3 http://www.aocat.net/docs/presentacio_ padro.pdf

4 You can see the test pilot developed in Catalan and Spanish at http://wdev.cat365.info/Cercador/cercador.asp?I=0.

# Factors Affecting Access to Electronic Information and Their Implications

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## INTRODUCTION

Information is a key ingredient in everyday life of the individual and the society at large.

Information has become increasingly more important with the emergence of information society. Information and knowledge are key resources, and generation and communication of these is the mainstay of the workforce in the emerging information society. Because of the value that information has in the day-to-day life and development of human beings, the right to information is held as a basic right of individuals in many countries. Information and knowledge exist in oral, print, and electronic forms.

However, information and knowledge have little value unless they are accessed when needed in a form they are needed. If access to existing information does not take place, the potential benefits of possessing of information will be lost. In other words, the key to unleashing the benefits of information and knowledge is effective access to them. As such access to information is recognized to be an instrument to help citizens to realize their own potential; to increase their skills, knowledge and capacity; and to take part in and benefit from information society (FARN, 2001). Scientific progress also depends upon the accessibility of existing scientific knowledge upon which new knowledge is built.

## BACKGROUND

As the importance of access to information is directly equated to the value of information, access to information is also recognized as a fundamental human right of citizens in many countries. The right to access to information is now expressed in policies, laws, acts, and regulations of many countries. Universal declaration of human rights also has provisions for the implementation of the right to access to information. Social institutions such as libraries, archives, schools in broader sense, and the mass media have been considered as instruments to preserve and facilitate access to information and knowledge.

The emergence and expansion of information in a digital form in particular has heralded, among others, faster and broader access to information in general. Efforts to benefit from the digital revolution are now among priority concerns of many countries, both developed and developing country. Access to electronic information essentially involves access to electronic technologies (the channel and prerequisite), access to electronic information sources (the container), and access to the content (the actual data, information and knowledge). However, access to electronic information is not always possible to all.

This article looks into the various factors that affect access to electronic information as well as the nature of their effects. Review of relevant research literature has been used to identify the factors affecting access to electronic information. The article further discusses the implications of the factors by taking the least developed countries (LDCs) as a good example since these countries are the most affected countries by the factors. Possible measures to address the effects of the factors are also presented in the conclusion part of the article.

## FACTORS AFFECTING ACCESS TO ELECTRONIC INFORMATION

Despite its importance, a significant number of people do not have as much access to the electronic information as required. The literature (more than 70 research reports and articles have been reviewed in preparing this article, of which most are also reviewed in Gashaw, 2002; Rice, McCreadie, & Chang, 2001) on factors influencing access to and use of IR systems, digital libraries, e-journals, and the Internet has consistently shown the existence and prevalence of a set of factors affecting access to electronic information. These factors can be organized under the following four categories: the characteristics of the end-users, the characteristics of the electronic information carriers, the characteristics of the electronic content, and the characteristics of the information environment in which access takes place. These are described below.

1. **Characteristics of the End-Users:** This refers to the qualities and capabilities that end-users bring to

information access process, including one's computing skills; experience in using electronic information resources and information; domain knowledge; language abilities; digital literacy (including attitude towards information, information seeking, and information use); beliefs about the capability, ease of use, and usefulness of information, information systems, and the Internet; perception about one's skills and knowledge; and financial ability to acquire electronic resources and training. Specific instances of the characteristics of the end-user hindering access to electronic information include the following: lack of experience in using information systems, networks, the Internet and electronic information; non-awareness of the resources available and ones rights and duties in utilizing the electronic resources; lack of confidence in one's ability; lack of knowledge of the language in which digital documents are available; and lack of interest and motivation in using electronic information systems and information

2. **Characteristics of the Electronic Information Carriers:** This refers to the features of the electronic information technologies and the electronic information sources, including the capabilities of the computing and network hardware, software, interface, and the Internet connection; ease of use of these resources; and physical accessibility (as access assumes availability) of the computing and network resources and electronic information sources. Specific instances of the characteristics of the electronic information carriers hindering access to electronic information include the following: physical non-availability of appropriate computing/network hardware and electronic information sources; insufficient capacity of computing/network hardware and software; physical non-availability of network/Internet connection; low capacity of network/Internet connection; physical inaccessibility of electronic information sources; and difficult to use interfaces
3. **Characteristics of the Content:** This refers to features of the content such as relevance (on the topic); type (text, graphics, audio, video); format (PDF, Word, PostScript, HTML); language (International languages such as English, local languages); form (full text, abstract, abstract and keywords, summaries); quality of content (accuracy, reliability, breadth, depth, trustworthiness); level of treatment of subject; organization (searchable, indexed); and file size that in one form or another affect access to the content. Specific instances of the characteristics of the content hindering access to electronic information include the following: physical non-availability of relevant content (topical) to the basic and immediate needs of end-users; physical inaccessibility of relevant content to the basic and immediate needs of end-users; poor presentation (delivery) of content; and poor quality of content (in terms of accuracy, reliability, breadth, depth, trustworthiness)
4. **Characteristics of the Overall Information Environment:** This refers to information-related features of the physical environment in which access to electronic information takes place, including information policy and regulations, general infrastructure of the country/organization, information culture of the country/organization, technical and other system support, overall economic level of the country, and cost of electronic information resources. Specific instances of the characteristics of the information environment hindering access to electronic information include the following: absence of supportive information policies and regulations; absence of personnel/technical support; high cost of electronic information technologies, information sources, and content; poor general infrastructure of the country; under-developed information culture of the country/organization; and prohibiting cultural and social norms to access all relevant content and carry out all useful information activities

From the above it can be observed that the factors affecting access to electronic information are constraints to accessing the electronic technologies, information sources and the content caused by the characteristics of the user, the characteristics of the electronic information carriers, the characteristics of the electronic content, and the characteristics of the environment.

Furthermore, access to electronic information is hindered when there is mismatch among the factors previously discussed. More specifically the following mismatches result in failure in accessing electronic information:

- Mismatch between the characteristics of the end-user and the characteristics of the electronic information carriers. For example, if the level of computing skills of the end-user does not match the skills requirements of or ease of use of the electronic information system, then access to information is affected negatively
- Mismatch between the characteristics of the end-user and that of the content. For example, if the end-user does not know the language in which the content is written, then access to information cannot take place
- Mismatch between the characteristics of the end-users and that of the overall information environ-

ment. For example, if the cost of access to the Internet in a country is beyond what end-users can afford, then access to Internet-based information is affected negatively
- Mismatch between the characteristics of the electronic information carriers and the characteristics of the content. For example, if the format of the content does not match the software capabilities of the computing resources, then the content can not be viewed, retrieved, and so forth, hindering access to electronic information from taking place
- Mismatch between the characteristics of the overall information environment and that of the electronic information carriers. For example, if the climatologic situation of a country is not accommodating to an imported computing system, then the system cannot function as desired, hindering access from taking place using the system
- Mismatch between the characteristics of the overall information environment and that of the content. For example, if end-users are not allowed to view certain types of content because of organizational policy, then access to such information cannot take place even if it is needed by the end-users

The existence of these factors in a given physical setting (i.e., a household, community, organization, or a country) affects access to electronic information in one or more of the following and other similar ways:

- By making the information content physically not available
- By making the information content physically inaccessible
- By making end-users perceive that the information content is physically not available
- By making end-users perceive that the information content is physically inaccessible
- By inconveniencing end-users in accessing the information content
- By de-motivating end-users from attempting access to the electronic information resources and the content
- By making end-users lack the appreciation of the importance and usefulness of accessing information content
- By making available electronic information difficult and discouraging to use
- By forcing end-users have underdeveloped information culture
- By making end-users deprived of computing skills and experience
- By keeping end-users ignorant of what is available and possible
- By making end-users lose confidence in their ability to access information content

## IMPLICATIONS OF FACTORS AFFECTING ACCESS TO ELECTRONIC INFORMATION IN LDCS

Obviously, the factors affecting access to electronic information primarily impact on those individuals, communities, or countries where the factors are in widespread. It is also obvious that these factors impact more on those activities that highly depend on access to electronic information, such as e-commerce, e-learning, and e-government.

LDCs are the most affected countries by the factors affecting access to electronic information. This is the case because most, if not all, of the factors hindering access to electronic information are found widely in these countries. The literature on the digital divide and statistics on ICT development indicators collected by international organizations such as ITU, the World Bank, the UN and OECD give us insight into the state of access to electronic information in LDCs. The evidence from this literature is valid because the digital divide is inequalities among individuals, households, communities and nations in accessing the electronic information, which includes accessing the carriers and the sources of electronic information (i.e., ICTs). Accordingly, although difficult to find complete data, we can gauge the nature and extent of access to electronic information in LDCs using the available facts and figures about LDCs in relation to indicators/indexes of the digital divide.

A wide range of digital divide indicators are in use to assess the nature and extent of the digital divide in a country. Assessed against widely used indicators of the digital divide, LDCs (or low-income countries as sometimes described by some international organizations) show the following:

### Electronic Carriers Related

- The number of fixed lines per 1000 inhabitants is 3.01 for Africa as compared to 41 for Europe (ITU, 2004)
- The number of computers per 1000 inhabitants is 7.5 as compared to 466.9 for developed or high income countries (ITU, 2003)
- The number of TVs per1000 inhabitants is 91 compared to 735 for developed or high income countries (ITU, 2003)

- They number of Internet users per 1000 inhabitants is 10 compared to 364 for developed or high income countries (ITU, 2003)
- The number of Internet hosts per 10,000 inhabitants is 4.2 for Africa as compared to 280.95 for Europe and 2002.47 for the Americas (ITU, 2004)
- The number of secure server is 435 as compared to 210, 134 for developed or high income countries (ITU, 2003)

## Content Related

- About 80% of the documents on the Internet is in English Language, targeting largely audiences of high income countries

## End-Users Related

- School enrolment: About 60% of children attend school as compared to 97% in developed or high-income countries (The Secretariat of the Pacific Community, 2004)
- Adult literacy is 49% as compared to 81% developing or high-income countries (Least Developed Countries Watch, n.d.)

## Environment Related

- Internet access price as percentage of monthly gross national income (GNI) per capita is 264.4 as compared to 1.6 for developed or high income countries (ITU, 2003)
- Total monthly price for 20 hrs of Internet use is USD 57 as compared to 23 for developed or high income countries (ITU, 2003)
- Absence of information and ICT policies are one of the major causes of the digital divide in LDCs (Parkes, 2003)
- In some African countries, up to 90% of the population lives in rural areas where the basic infrastructure is lacking (Parkes, 2003)
- GNI is USD 761 or less

These show the status of the digital divide in developing countries, and hence status of access to electronic information. They specifically point out, among others, that access to electronic information is severely limited in LDCs. Some of the indicators above also show the impact of the factors in these countries. For example, only about 10 out of 1000 inhabitants of LDCs are connected to the Internet due to environmental related factors (high Internet connection cost), content-related factors (shortage of relevant content for local needs), end-user related factors (lack of computing skills), and electronic information carriers related factors (lack of computer hardware). One can also find similar implications of the existence of the factors affecting access to the electronic information in LDCs in one form or another. For example, the research literature indicates that the inhabitants of LDCs:

- Have difficulty in locating information content that is relevant to their lives and their community on the Internet (due to lack of skills and investment for LDCs to have locally relevant data in local languages available on the Internet) (Yu, 2001),
- Have difficulty getting up-to-date information about their own setting (due to lack of funding, lack of innovative use of ICTs and underdeveloped information culture) (Bridges.org, n.d.)
- Have limited interest in using the Internet which contains mainly information in English (due to high illiteracy level of the country) (Bridges.org, n.d.)
- Have difficulty understanding the major portion of the information on the Internet written in English (due of high illiteracy mainly) (Bridges.org, n.d.)
- Find Internet connection cost prohibitive (mainly due to very low income of the general public, inadequately and poorly maintained telecommunications and restrictive state controls) (Cureo, 2002; Yu, 2001)
- Continue to have difficulty getting access to computers, training, and telephone connections (due to the general poor economic situation of the countries) (Bridges.org, n.d.; Cureo, 2002; Yu, 2001)
- Have limited access to the Internet (due to high access costs, chronic lack of infrastructure and bandwidth, lack of IT skills and experience, low literacy levels, and poorly coordinated ICT policies) (Cureo, 2002; Parkes, 2003; Yu, 2001)
- Have difficulty in building capacity to use ICTs (due to mainly high cost and lack of ICT training locally) (Bridges.org, n.d.)
- Find owning and using computers difficult (due to high cost of computers, constant failure of electricity, and lack of physical space to keep ones computer at home) (Bridges.org, n.d.; Cureo, 2002; Yu, 2001)
- Have difficulty in integrating ICTs seamlessly into their operations (due to equipment failure and lack of technical knowledge mainly), (Bridges.org, n.d.)
- Have difficulty using computers as tools of everyday activities (because the majority, such as business clients, with whom interaction is expected to take place do not have access to ICTs) (Bridges.org, n.d.)

Given these, LDCs face, among other things, difficulties to engage in activities that depend on access to electronic information. Embarking on such activities as e-learning, e-commerce, and e-government is severely constrained by the existence of the factors affecting access to electronic information. Thus, addressing these factors should be a priority issue for LDCs in order to participate and benefit from the potentials of the information age. Considering the key role that these activities could play in the emerging information and global economy, problems of access to electronic information becomes the main threat for the socio-economic progress that LDCs cannot afford to ignore.

## APPROACHES TO ADDRESS THE FACTORS AFFECTING ACCESS TO ELECTRONIC INFORMATION

For access to electronic information to take place, all the required matches among the factors need to be made. Therefore, it is necessary for each physical setting (i.e., an organization, a community, a country) to first identify what mismatches are currently hindering it from accessing electronic information as desired. This should be followed by identification of appropriate measures to enhance access or specifically overcome the identified barriers in the setting. In this connection, the following measures are relevant to enhance access or overcome barriers to access to electronic information.

To achieve a match between the characteristics of end-users and the electronic information carriers, the following measures or enhancers of access to electronic information need to be fulfilled on the part of the end-users: acquisition of computing skills and adequate relevant experience in using electronic resources and information. On the part of the electronic information carriers, the following need to be in place: physically accessible, affordable, appropriate, easy to use and functional computing and network hardware in adequate number; physically accessible, affordable, appropriate, and easy to use software and interface, including interfaces supporting local languages; physically accessible, affordable, easy to use, and adequate network and Internet connections; and physically accessible, affordable, appropriate, easy to use, and adequate electronic information sources containing potentially relevant content.

To achieve a match between the characteristics of the end-users and that of the content, the following need to be achieved on the part of the end-users: acquisition of computing skills and adequate relevant experience in using electronic resources and information. On the part of the characteristics of the content the following need to be in place: physically accessible (i.e., viewable, retrievable, downloadable and printable), affordable, relevant (on the topic), and quality (in terms of accuracy, reliability, breadth, depth, trustworthiness) content; and physically accessible content that is appropriately formatted, organized, interactive, compatible with the existing system and environment, understandable, and in known languages of target end-users.

To achieve a match between the characteristics of the end-users and that of their environment, the following need to be in place on the part of the environment:

- availability of supportive information policies and regulations; physically accessible technical supports;
- physically accessible and affordable electronic technology, information sources, content, and services; adequate basic infrastructure in the country;
- physically accessible financial support or subsidies; higher level of literacy among the population; adequate public information access points (in terms of number and quality);
- informed and responsible government of its information duties; and
- a well-developed information culture at the individual, community, organizational, and national levels.

In a similar way, to achieve a match between the characteristics of the electronic carriers and that of the content, the following need to be in place on the part of the content: physically accessible content; content that is compatible with the characteristics of existing electronic information resources (such as the capacity of hardware storage and version of software in use). It is theoretically possible to require the system to be capable enough to support all types and kinds of content. However, experience has shown that it is not possible to anyone to own or have access to the latest computing resources all the time in order for us to consider having the latest electronic information carriers as a measure to achieve a match between the characteristics of the electronic carriers and that of the content.

To achieve a match between the characteristics of electronic information carriers and that of the environment the following are necessary on the part of the electronic information carriers: physically accessible computing/network hardware and software appropriate to the climatologic and the level of development of the basic infrastructure of the environment; physically accessible electronic information sources appropriate to the climatologic and to the level of development of the basic infrastructure of the environment; physically accessible computing and network resources (i.e., computing and

network hardware, software, and information sources) feasible of developing and maintaining in the environment; and physically accessible computing and network resources (i.e., computing and network hardware, software, and information sources) affordable within the state of economic development of the environment.

Finally, to achieve a match between the characteristics of the content and that of the environment, content that is relevant and acceptable within the environment should be in place while the environment has to provide mechanisms that avoid too much restriction on the free flow of content in and out of the environment.

Individual users, user communities, organizations, the business community, governments, and international communities and business as appropriate are responsible to fulfill these enhancers of access to electronic information.

## CONCLUSION

The previous discussion of factors affecting access to electronic information and their corresponding measures can be used as guide to determine the access situation of each setting and the corresponding measures to address the factors. The list of factors provides a checklist of possible factors that could exist in any given setting and for which one has to look for when interested to learn about the access situation of a setting. The description of possible mismatches further illuminates and organizes the factors in more focused sense. The list of potentially relevant measures for each factor discussed above can be used as a starting point to address the identified factors.

Accordingly, LDCs need to first identify the specific factors affecting their access to electronic information. This effort can be guided by the list of factors previously described, particularly to make LDCs aware of the possible factors, to help them articulate the factors that specifically hold true in their setting, and guide them characterize the factors in terms user-related, carrier related, content-related, and environment related. LDCs can further learn about the characteristics of the factors by seeing them in terms of the different possible mismatches identified for each category. Knowledge of the root causes of the factors is also necessary in order to identify or select feasible measures to address the factors. LDCs should then consider appropriate measures to address the factors. This effort also can be assisted by the list of possible measures previously discussed.

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## KEY TERMS

**Access to Electronic Information:** Access to electronic information is the process of interacting with electronic information technologies, electronic sources, and electronic content for the purpose of acquiring information and knowledge from the content.

**Digital Divide:** The digital divide is inequalities in access to ICTs, computing skills and electronic information content among individuals, household, and communities within a country and among countries.

**Digital Libraries:** Digital libraries are organized collection of knowledge, stored in digital/electronic format, and accessible to users via digital/electronic interface technologies.

**Digital Literacy:** Digital literacy refers to the ability to locate, understand, synthesize, evaluate and use information from a variety of sources when presented via computers and the Internet. Digital literacy also includes the ability to recognize when information is needed.

**Electronic Information Carriers:** Electronic information carriers consist of the electronic information technologies and electronic information sources required to capture, store, and deliver digital content to end-users

**Electronic Information Sources:** Electronic information sources broadly refer to electronic-information bearing objects such as e-journals, e-books, electronic documents, electronic databases, Internet resources (e-mail, listservs, discussion group), intranet resources, electronic archives, and electronic data files (numerical data, image data, multimedia data), which contain information and knowledge.

**Electronic Information Technologies:** Electronic technologies are the channels through which the electronic content is accessed and delivered to end-users. The electronic information technologies include computer systems, communication networks and the Internet.

**Electronic Information:** Electronic information is any signs, signals, writing, images, sounds, data, or intelligence of any nature stored in whole or in part in electronic form.

**Internet:** The Internet is a collection of networked computers all over the world, connected via telecommunication networks, that allows for transfer of data from one computer to another, using common protocols. The Internet allows access to millions of Web pages, other electronic documents, and services such as e-mail.

**Least Developed Countries (LDCs):** These are countries with "low living standards (i.e., low real income per capita[below USD 800]) associated with high income inequality, poor health and inadequate education and limited life expectancy; low levels of productivity possibly because of limited resources; unskilled labor; weak complementary factors and management practices and backward technology; high population growth rate due to falling death rate resulting in significant dependency burdens; large-scale unemployment and underemployment; a small industrial sector with outdated technology unable to employ large numbers of poorly educated workers; large but neglected agricultural sector and outward migration from rural to urban areas; market imperfections" (TUTOR2U, 2003). Currently, 50 countries with a combined population of more than 600 million people are identified as LDCs. Of today's 50 LDCs, 35 are in Africa, 9 in Asia, 1 in the Caribbean and 5 in the Pacific Region.

# Foundation for Citizen-Oriented E-Governance Models

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## INTRODUCTION

The present knowledge era needs new democratic practices. The use of information and communications technology (ICT) has been considered the potential tool for rethinking democracy and political action. Working with research and development (R&D) on this potential means whole new sets of concepts, and practical solutions need to be innovated. This article describes and compares several new ICT-aided models—tested, in use, or under research—that emphasize citizens' needs as the fundamental approach to societal decision making and that regard citizens as collaborative decision makers. The new citizen-oriented approach is fundamentally transformative and calls for new innovative approaches in order to employ ICT for governance and empowerment of citizens. E-governance is considered to be an integrative concept for governance and democracy, while the focus of this article is on e-democracy.

In the foundations of e-governance lie the ensuring of universal access to data, information, and knowledge for citizens in order to enable them to build their personal knowledge base and to empower them to become independent decision-making collaborators (Keskinen, 2001; OECD/PUMA, 2000). The interactive decision-making approach calls for new models that will complement, evolve, and reform the current representative democracy to better suit the modern needs of rapidly moving and changing societies (Becker, 1995; Becker & Slaton, 1997; Keskinen, 1997). Furthermore, the potential of ICT means whole new sets of concepts and practical solutions to be innovated.

The world of the 21st century is globalized (Albrow, 1997), not only in an economic sense but also in a social, political, environmental, and technical sense (Axford, 1996; Kuosa, 2001). The Internet, global media and advertising, multinational enterprises, and brands (Florida, 2002; Klein, 2001) have created both a more global consciousness (Rifkin, 2001) supported by rapidly evolving ICT (Castells, 1996-1998) and a new geographical dimension—cyberspace, which can be seen as a complementary dimension to society. The Western world's societies have changed dramatically in the past 200 years, and the speed of change does not show any signs of slowing down. Should not old-fashioned representative democracy change, as well? (Keskinen, 2004; Keskinen, Aaltonen, & Mitleton-Kelly, 2003; Kuosa, 2004; Pertierra, Ugarte, Pingol, Hernandez, & Dacanay, 2002).

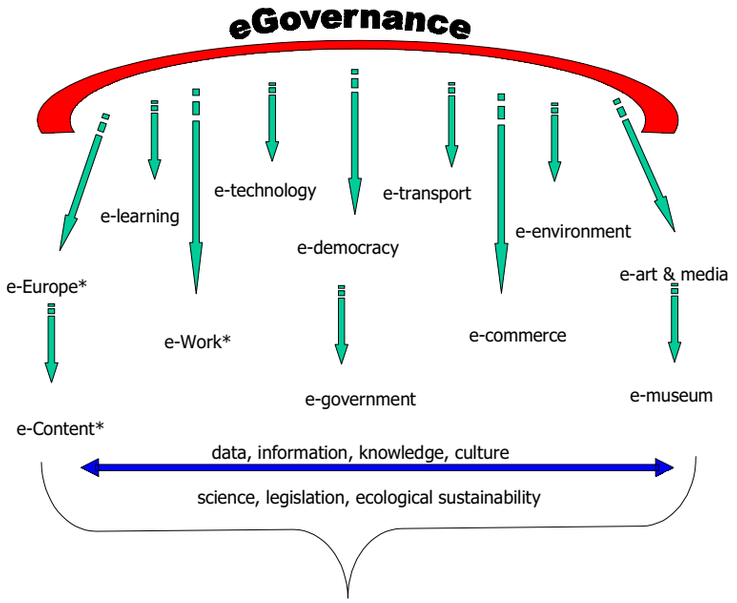
The new interactive decision-making approach presented in this article attempts to close the gap between 19th and 21st centuries' needs by emphasizing citizens' active roles in political decision making. This approach is based on legally tied participatory citizenship (Barber, 1984), as is the case in the multiphase referendum model, for example. The models should focus on citizens' needs and should regard citizens as collaborative decision makers. Political authorities should be tied with decisions taken in legally organized deliberative procedures.

## BACKGROUND: BASIC ASSUMPTIONS OF E-GOVERNANCE

E-governance is a novel term that has acquired many meanings, although they are rather undefined so far. In this article, e-governance is considered the integrative concept for several e-oriented methods for governing. Governance thus can mean organizational or personal governance (see Figure 1).

The figure indicates that recent R&D has focused on many different e-oriented sectors of society, especially in the latest framework programs of the European Union research and technological development. It is relevant to realize that common to all e-approaches are the understanding and development of inclusive data, information, and knowledge. Cultural, ecological, and legislative challenges are very much the same in all e-oriented R&D, and hence, the paradigms of conventional research fields will be under revitalization.

*Figure 1. E-governance as the integrating approach to e-oriented R&D areas (designed and collected by Keskinen).*




**These names refer to multi-annual research and development programs of the European Commission (see www.cordis.lu), whereas others refer to various sectors in general.*

Furthermore, the most important approach is that different decision models to be used for e-governance in general and e-democracy in particular can be used in different stages of the decision-making process. This means that all models of citizenship are not mutually exclusive but that they play different roles during the life cycle of the process, and furthermore, this decision also should be made by citizens through a collaborative procedure.

## BASIC ASSUMPTIONS OF CITIZEN-ORIENTED APPROACH

It is necessary to make some basic assumptions for R&D of citizen-orientation as follows:

1. Employing ICT for decision making could contribute to better decision-making procedures.
2. Transformational politics should be pursued.
3. The representative model is still a valid one, and other models are complementary to it.
4. E-governance and e-democracy can lead to societal decision making in order to become more interactive.

In addition, in citizen orientation, citizens are considered decision makers with equal opportunities with representative decision makers. The important difference to all other models is that citizens, not politicians, define the agenda; that is, this process should be interactive and based on win-win strategies. However, there has to be a procedure to coordinate this process and to avoid contingency and continuous need of voters' input. In other words, citizens in many cases should be in the role of strategic decision makers and conventional decision makers in the role of executives (Becker, 1995; Keskinen, 1997; Keskinen & Kuosa, 2004; OECD, 2001).

## MODELS FOR INTERACTIVE DECISION MAKING AND CITIZEN ORIENTATION

Almost all ICT tools can be used to help deliberative and participatory democracy. Relevant and already much used tools can be listed as follows: the Internet, text messaging (SMS), digital TV, local TV, and radio and online debates. Much used models include online polls, citizens' jury, deliberative poll (televote is a specifically researched and tested version of it), drawing lot (an old model that is still usable), funnel model, e-vote, and multiphase referen-

dum. It is also clear that the present state of the art of interactive communications methods must be developed further in order to facilitate genuine dialogue between the concerned parties (Carson, White, Hendriks, & Palmer, 2002; Keskinen 1999; Keskinen, Becker, Slaton, Ohlin, & Schmidt, 2001; Keskinen & Kuosa, 2004).

As already mentioned, a number of successful methods has already been used throughout the world beginning in the 1970s. Some of these methods can be grouped under the term *deliberative designs* because of their high level of group interactivity coupled with thoughtful discussion and argumentation. In the following, Televote, electronic town meeting (ETM), funnel model, citizens' jury model, multiphase referendum model, and citizen-oriented model are described briefly and compared. Of these, Televote, ETM, and citizens' jury are well tested and widely in use; funnel model has been tested in a multiannual pilot project in Finland, the multiphase referendum and citizen-oriented models are theoretical and have been developed through R&D projects in a few countries.

## The Scientific Deliberative Poll Model (Televote)

Televote is a "scientific, deliberative public opinion poll" (Slaton, 1992, p. 2). The deliberative poll was designed by James Fishkin, who has conducted a number of different versions of these (mostly in the U.S. but also in the UK, Australia, and Denmark).

Conventional public opinion polls are part of the weakness of modern representative democracies. Rarely are they used to allow citizens to state preferences for political agendas or to set priorities. Questions often are superficial, and alternatives are confined to a narrow range of choices determined by out-of-touch elites. In addition, citizens who are civic-minded enough to respond usually are caught in the midst of their daily routines and are not thinking about the issue of the poll when they are asked to give their opinion. The modern deliberative poll is clearly and rigorously structured to present a range of balanced information and expert opinion that is shared with a statistically representative population sample. When brought together in a central location, each citizen is treated with great respect, is given abundant time to think about all the data and opinions and, furthermore, is provided with opportunities to deliberate privately and publicly. The result is a far more in-depth, high-quality breed of public opinion, one that earns the description of being informed and deliberated (Keskinen, 2004).

Some of these models use a face-to-face jury style procedure pioneered by the Jefferson Center in Minneapolis, Minnesota, whereas some use the telephone and TV and have citizens deliberating in their homes (the Hawaii Televote model [Becker, 1995]). Some of these models use large face-to-face groups; some use small groups. At the end of these gatherings (usually conducted over two to three days), participants are surveyed again. There is no pursuit toward consensus; the responses are individual. The Televote model has been used successfully by Ted Becker (1995) and Christa Slaton (1992) in the U.S., Canada, New Zealand, and Hawaii. All have been eminently successful, particularly in the responses of the participants who almost unanimously applaud the new methods of polling as being empowering.

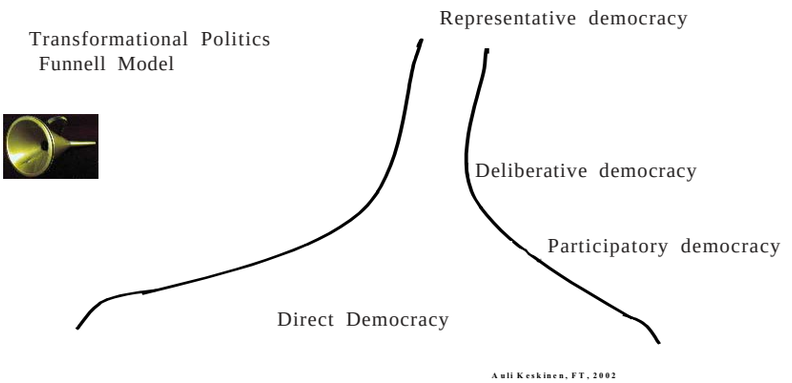
## Electronic Town Meetings (ETMs) Model

Over the past 15 years or so, there has been a number of authentic ETM experiments, whose purpose is to emulate and improve the traditional New England town meeting. Thus, there must be discussion and deliberation among ordinary citizens and a vote that determines the outcome. In addition, there must be some use of electronic media in order to facilitate this process. Most of these experiments have tried to mix several of the following components: interactive TV, interactive radio, scientific deliberative polling, telephone voting, and a wide variety of face-to-face meetings including those facilitated by the use of electronic handsets. Some have focused on problem issues; some have involved planning or envisioning processes. Most have been at local, state, or provincial levels. One of the most interesting ETMs (because it was to be binding for five members of Parliament) was conducted by the Reform Party of Canada in Calgary, Alberta. It used random samples from citizens of five parliamentary districts, who watched a televised debate on the important issue of physician-assisted suicide (euthanasia) and then voted by phone (Becker, 1995). The ETM seems to promise an alternative way to set public agendas and priorities for various legislative bodies to follow as well as being an alternative method of putting referenda before the public—a tool of direct empowerment (Becker, 1995; Becker & Slaton, 1997; Keskinen, 2004).

## Citizens' Jury Model

The citizens' jury is based on a deliberative design created by Ned Crosby in the US in the 1970s. The jury typically is selected using stratified sampling in order to match a profile of a given population. The participants (usually a group of 12 to 20 people) spend two to five days deliberating under the guidance of an impartial moderator. All participants have opportunities to question experts and to discuss the complexities of the issue and are asked to work toward a consensus response.

*Figure 2. Funnel model (Adapted from model used in Finland for Youth Council experiment in 1997-2000)*




Hundreds of citizens' juries have been conducted throughout the world since the mid-1970s; for example, in the US, UK, and Australia (Carson & Martin, 1999; Keskinen & Kuosa, 2005). The modern Citizens' Jury model naturally uses all available ICTs, especially the Internet, for information gathering, online polls discussions, and information dissemination.

## FUNNEL MODEL

The funnel model is based on the multi-use of different decision-making models (see Figure 2.)

The process of the funnel model is multiphase. It includes direct democracy in the first phase, when new ideas begin to form in a population. In the second phase, a participatory model is chosen for finding arguments for alternatives that can be supported by actor groups. The third phase finds genuine dialogue between the concerned parties—experts, citizens, decision makers. For this phase, several deliberative models are suitable. The final decision is made using an ordinary representative method. This model has been tried successfully by youth parliaments in several municipalities of Finland and by the Maunula suburb of Helsinki since the mid-1990s (Keskinen, 2004; Maunula, 2002). The Maunula (2002) case is based on comprehensive use of Internet tools.

## Multiphase Referendum Model

A multiphase referendum could be used in local and regional decision-making arenas. The multiphase referendum model has been discussed by Keskinen (1997) and is described in Table 1 (Keskinen & Kuosa, 2005).

The important questions raised here include the following: In what phases do the citizens participate? How? Who will coordinate the processes? If the model of democracy in the society were deliberative or direct, then citizens would participate throughout all phases, starting from Phase 1. If the democracy model used in the society would be participatory, then citizens will participate in Phases 2, 5, and 6, whereas in present representative democracy, they participate only in Phase 5 (Held, 1987; Lane & Ersson, 2000).

## New Citizen-Oriented Model

The most important approach to new democracy modeling is that different decision models can be used during

*Table 1. The multiphase referendum model*

| Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | Phase 6 | Phase 7 |
|---|---|---|---|---|---|---|
| Agenda setting: what is the opinion poll to be organized about? What for? The aim: binding or recommendatory? | What will be asked? The background research and its results are disseminated. Dialogues, discussions, learning processes, developing the alternatives needed for Phase 3 | What are the alternatives for the referendum? | What are the methods used in the referendum? Technical solutions, alternative tools for opinion giving? | The referendum process | Presenting and disseminating the results, public dialogue, and debates | Decisions based on the results, other action or events recurring from Phase 1. |

*Table 2. Comparison of e-democracy models (revised and complemented from Carson et al., 2003); the ICT tools and the Internet employed in all models*

| Models | Opinions Accessed | Weakness/Strength |
|---|---|---|
| **Televote and ETM Models** | Explores what respondents think now measured against what people think after they receive additional information (with encouragement to engage in discussion with family and friends). | If discussing only with like-minded people (or not discussing at all), respondents may become confused, anxious, or entrenched in their views due to the unexpected complexity of an issue. Questions can be answered only if private research is undertaken. Self-interest is tempered by conversation with others (if discussion occurs). |
| **Citizens' Jury Model** | What people think after they have had access to full information, an opportunity to question specialists, and time to argue/discuss the merits of the case with their peers. Required to build consensus but not to reach it. The process is flexible to meet the group's needs. | Allows for decisions (usually in the form of recommendations) that can take account of the complexity of the issue, minority opinions and new ideas. Diversity of opinions and independent, skilled facilitation. Time for deliberation means that any concerns can be allayed or confirmed. Appeals to common interest. |
| **Funnel Model** | What people think in several phases: (1) free forum for direct democracy; all tools and methods allowed; (2) alternatives selected for further work by participatory models; (3) dialogue in deliberative mode between decision makers and citizens; (4) decision making through representative methods. | Wide array of opinions come together, long hyper-cycle type knowledge development process assures that all voices are heard and that minorities stay minorities. Time for deliberation granted. Time-consuming. Appeals to common interest. |
| **Multi-Phase Referendum Model** | What people think now, starting with agenda setting (i.e., what issues will be processed and what are the options [several] and how the result will be treated). Opinion is expressed as a vote in several phases, if decided so. | Several alternative responses are available, and respondents may be confused and anxious about the unexpected complexity of an issue in the absence of debate. Appeals to self-interest but gives the opportunity to converge after several rounds of votes. Time-consuming. |
| **Citizen-Oriented Model** | Respondents are asked for well-argued and weighted opinions that have been formed by self-organizing groups of people through direct and deliberative democratic dialogue processes. Funnel Model appropriate. | Model is time-consuming and, in the beginning, sensitive to those opinions that are voiced loudest. However, given enough time and varying combinations of group members, all voices evidently will be heard. Appeals to both self and common interests. |

different stages of the decision process. This means that all of the models of citizenship are not mutually exclusive, but that they play different roles during the life cycle of the process and, furthermore, are decided by the citizens. In the citizen-oriented Model, citizens are considered to be decision makers with equal opportunities to reach representative decision makers. In this model, the vital difference from all other models is that the citizens, not the politicians, set the agenda; that is, this process should be interactive and based on win-win strategies (Henderson, 1996). Actually, all citizens should be able to take part in strategic decision making, while conventional decision makers can take the role of executive decision makers by utilizing the Internet and other ICT tools (OECD, 2001; Keskinen, 2004).

## Comparison of Interactive Decision-Making and E-Democracy Models

The comparison shows some common factors of all the methods of deliberative models. On the one hand, they aim at genuine dialogue, representativeness, deepening understanding of the complexity of the issues to be decided, enhancement of the knowledge base, and involvement of several new multi-stakeholders; on the other hand, they specifically challenge the decision-making processes and the time spent preparing arguments for good decisions (Santa Fe Institute, 2001; Keskinen et al., 2003). Table 2 compares the successful models used (e.g., Finland) (Keskinen, 1997, 1999), Australia (Carson & Martin, 1999; Carson, White, Hendriks, & Palmer, 2003), Sweden (Ohlin, 1998), Denmark (Schmidt, 1993), and the U.S. (Becker, 1995; Keskinen, 2004; Slaton, 1992).

In summary, the most important approach to new democracy modeling is that different decision models can be used during different stages of the decision process. This means that all the models of citizenship are not mutually exclusive but complement each other (Becker & Slaton, 2000). In the new citizen-nriented model, citizens are considered decision makers with equal opportunities to reach representative decision makers. In this model, the vital difference from all other models is that the citizens, not the politicians alone, set the agenda.

## FUTURE TRENDS

The future models of democracy are very open in regard to the technology utilized; almost any current technology can be used for implementation of them. The critical question is more of a political and a social one: What type of citizenship models do European or Western societies want to develop for what types of decisions? The citizen-oriented model can be created in a technological or political sense, but a public understanding should emerge on actually wanting this type of participation. More participation in every decision is not necessarily compatible with an efficient modern state, even a democratic one. Actually, the great challenge of the future for societal decision making is how to incorporate the self-organizing, ad-hoc decision making to the representative official decision-making processes in a democratic manner (Becker & Slaton, 1997; Keskinen, 2004; Rättilä, 1999; Woolpert, Slaton, & Schwerin, 1998).

## CONCLUSION

As a challenge for collaboration of ICT developers and policy developers, it is clear that much more tailored ICT tools are needed in order to create necessary forums for public dialogue in accordance with the 21st century's new needs. These forums should encompass interested and motivated citizens as well as responsible political and societal decision makers who form the present social networks that are working for our common issues, which is what democracy should be about (Keskinen et al., 2001). As democracy advocate Benjamin Barber (1984, p. 195) said, "We must together govern our societies ourselves; there is no one else to govern for us."

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## KEY TERMS

**Access:** One of the three preconditions for citizen participation in e-democracy (Access-Competence-Motivation). Access to communication involves existence of technical and logical access point, communications device, and permission to access.

**Citizen-Oriented Model:** In a citizen-oriented model for e-democracy, citizens are considered to be decision makers with equal opportunities to reach representative decision makers. In this model, the citizens, not the politicians, set the agenda; this process is interactive and based on win-win strategies. However, there has to be a procedure in order to coordinate this process and to avoid the continuous need for voter input. Citizens should be able take part in strategic decision making, while conventional decision makers take the role of executive decision makers.

**Citizens' Jury:** A group of people selected for preparation of public opinion. The jury typically is selected using stratified sampling in order to match a profile of a given population. The participants (usually a group of 12 to 20) spend two to five days deliberating on a charge under the guidance of an impartial moderator. Participants have opportunities to question experts and to discuss the complexities of the issue and are asked to work toward a consensus response.

**Competence:** One of the three preconditions for citizen participation in e-democracy (Access-Competence-Motivation). Communications competence means that a person has the ability to use channels of communication, opportunity, access, and skills in order to use the devices involved and to formulate message.

**Deliberative Poll, Televote:** As a specific researched and tested model, it is a scientific public opinion poll with a deliberative element Generally, a phone survey is conducted, then hundreds of respondents are invited (using statistical sampling technology) to come together at a single location, or they are asked to deliberate among themselves and with other interested people and to form opinions. When they gather, they deliberate on the issue and have an opportunity to work in small groups (each like a citizens' jury or planning cell), also spending time in plenary sessions in which experts are questioned. At the end of the gathering (usually conducted for two to three days), participants are surveyed again.

**E-Democracy, Teledemocracy:** The use of modern information and communications technologies as instruments to empower the people in a democracy in order to help set agendas, establish priorities, make important policies and participate in decision making and implementation in an informed and deliberative way.

**E-Governance:** Considered to be an integrative term for e-government and e-democracy to start with, but also other e-oriented operations in the knowledge society can be placed under the umbrella; however, the concept is still evolving. E-governance means governing personal or organizational life with the help of ICT.

**Electronic Town Meeting (ETM):** In an electronic town meeting, there is discussion, deliberation among ordinary citizens, and a vote that determines the outcome. Electronic media are used to facilitate the process. Generally, a combination of several of the following electronic means are used: interactive TV, interactive radio, scientific deliberative polling, telephone voting, mobile phones, and a wide variety of face-to-face meetings. The focus of the process is on problem issues, involved planning, or envisioning processes. ETM can be conducted in local, regional, or national levels.

**Empowerment:** A process of transferring power in order to enable people to govern their own lives, not to gain power over other people or events. People are empowered when they are given the authority to make decisions in their daily work, using their own judgment to take apt actions in new situations rather than consulting management.

**Motivation:** One of the three preconditions for citizen participation in e-democracy (Access-Competence-Motivation). The sender and recipient of communications must have a reason for sending messages and for learning new skills. Human needs for self-expression, attachment, societal interaction, association, and control of one's own life are motivating reasons. In addition, in order to be motivated, people need to feel that their opinions are heard and that they can have an impact on decisions. Without motivation, citizens will not participate in public issues.

**Referendum:** A public opinion poll, generally binding, where local, regional, or national authorities offer citizens the possibility to vote on a specific issue, generally with two alternatives: yes or no. The multiphase referendum uses deliberative agenda setting, feedback processes, and multiple choices, and therefore, actually presupposes a deliberative or participatory democracy model to be employed.

**Teledemocracy:** See E-Democracy.

**Televote:** See Deliberative Poll.

# From CCTV to Biometrics through Mobile Surveillance

F

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## INTRODUCTION

*Surveillance* is the act or process of observing, tracking, or recording personal details for the purpose of exercising control over the individual or population being watched. Control in this context can mean many things, from directly influencing the behavior of the observed to the use of gathered information for the purpose of management or governance.

Mobile surveillance can be defined as two distinct, yet related, practices. The first is the ability to observe the physical movement of an individual through space. This is most often accomplished through documenting their interaction with a surveillance network. The object of surveillance is tracked from one node of the network to another, providing a record of behavior. The second practice is often referred to as dataveillance, or the ability to monitor an individual's behavior through studying a trail of personally identifiable data, including credit card purchases, mobile phone calls, and health records.

Mobile surveillance employs an array of technologies including video and photography cameras, visual recognition software, radio frequency identification (RFID), global positioning receivers (GPS), information and communication technologies (ICTs), and biometrics. Examples of mobile surveillance networks include the dense deployment of closed-circuit television (CCTV), video, and photographic technologies in a distinct geographic space to monitor activity, the tracking of automobiles and mobile phones via GPS, and radio frequency sensing that records motion as identity chips pass through a distributed network of receivers. As these networks proliferate, individuals are the exposed to overlapping layers of surveillance. Although many of these surveillance networks are deployed for limited purposes, the increasing ability to save and store personally identifiable information in searchable databases, and the ability to mine information from multiple sources raises privacy concerns for the individual. This is especially true in advanced capitalist societies that rely on sophisticated data gathering to track, model, and predict consumer behavior, as well as for citizen management.

## BACKGROUND: SURVEILLANCE, BUREAUCRACY, AND THE STATE

Surveillance has been an integral part of human social interaction since the need for oversight and management of collective endeavors was first realized. As the scope and complexity of these endeavors grew, the need for more reliable information increased accordingly. Surveillance has long been an important method for dealing with risk (Lyon, 1994, 2002, 2003a, 2003b), as the advanced knowledge of aberrant behavior can help minimize the threat or upheaval caused by the unusual events or actions. Therefore, surveillance is often a positive feature of governance, allowing those in power to manage against risk in order to protect public welfare. Nevertheless, surveillance regimes are also employed by the state out of a "desire to more completely manage populations (Lyon, 2003b, p. 20)," identifying and sorting out individuals who's behavior is deemed threatening to the majority. It is of little surprise that the fields of law enforcement and national security and intelligence gathering are the sites of some of the most sophisticated surveillance practices as well as the targets of social concern over privacy and the power of the state.

In *Discipline and Punish*, Foucault (1977) examines the rise of the surveillance society by utilizing Jeremy Bentham's Panopticon prison as a model for the exercise of power in modern society. The architecture of the Panopticon exerts power over the incarcerated body by making it constantly visible to an invisible central observer. The prospect of persistent observation is used to ensure compliance with the disciplinary rules of the institution, therefore making the simple awareness of surveillance a means of exerting power over the watched individual.

Foucault (1977) notes the historic extension of surveillance architecture from the prison to other social institutions such as schools, hospitals, mental institutions, and the workplace, which increasingly relied on the specter of persistent observation in order to exert control over their subjects. In addition to the direct surveillance enabled by panoptic architecture, the rise of bureaucratic

organizations, especially in the West, lead to an institutionalization of mechanisms for the capture, retention, and processing of personally identifiable data.

The direct and indirect surveillance employed by public libraries in Victorian Britain (Black, 2001) serves as a historical example of this phenomenon. Libraries have been at the forefront of efforts to manage, catalogue, and retrieve information since the sorting, and storing of information is central to their mission. To this end, libraries have employed increasingly sophisticated surveillance mechanisms to track, record, and monitor the habits of their users and their interaction with the library's collections. While the hierarchical systems of knowledge and the tracking of library users' habits employed in Victorian libraries did not necessarily originate as a means of coercive control but often as an effort to provide enhanced service, their existence often placed the librarian in a position of social power over those observed (Black, 2001, p. 74).

Surveillance is a central feature of the rational bureaucratic organization in modern society, and the explosion of surveillance is intertwined with the historical development and growth of bureaucratic organizations (Beniger, 1986; Dandeker, 1990; Foucault, 1977; Giddens, 1987; Lyon, 1994; Weber, 1968). Dandeker describes the symbiotic relationship between capitalist organizations and the modern state, declaring that their activities are focused on both the internal exigencies of managing a system of administrative control over subject populations and the problems attendant upon monitoring and managing external relations with other organizations. This theme has been central in providing a framework in terms of which the growth of bureaucratic surveillance in modern societies can be explained. (p. 195)

In *Control Revolution*, Beniger (1986) writes that "bureaucratic organization serves as the generalized means to control all large social systems, tending to develop whenever collective activities need to be coordinated toward some explicit and impersonal goal, that is, to be controlled" (p. 390). As the complexity of operations required to control the functioning of a bureaucratic organization increases, so to does the need for advanced technologies to manage information throughput (Beniger, 1986, p. 424). Historically, bureaucratic organizations have utilized technological advances to exert control over the volume of information vital to the functioning of their operation, often to automate data gathering, record keeping, and record retrieval.

Dandeker (1990, p. 40) provides an excellent four point schema for evaluating the surveillance capacity of organizations. This model evaluates the size of the files held in a surveillance system, the centralization of those files, the speed of information flows, and the points of contact between the system and its subject population. The escalating use of automated surveillance technologies, sorting software, and searchable computer databases has lead to increases in all four of these areas and has greatly enhanced the surveillance capacity of organizations, making the practice of mobile surveillance possible. The ability of organizations to utilize information and computer technologies in order to search and cross-reference personally identifiable information from a variety of independently established databases has greatly expanded the scope of their surveillance, and has enabled the tracking of individual through digital data profiles compiled from records stored in computer databases.

## MOBILE SURVEILLANCE

As social relationships have become more fluid and individual mobility increases, surveillance technologies have developed to keep up with the mobile subject. They are increasingly capable of tracking subjects on the move, and across various media, and through a variety of environments, casting a continual and inescapable gaze upon their subject (Lyon, 2003b). This is accomplished in a variety of ways. Perhaps the surveillance regime that most clearly illustrates the capabilities of mobile surveillance, and embodies the extension of Foucault's panopticism into society at large is CCTV. A CCTV system consists of a network of cameras that provide optical surveillance of a specific geographic area and transmits the visual data to a central location for analysis.

CCTV is most often employed by law enforcement in high-crime areas as a method for identifying criminal behavior, as well as a deterrent factor. Additionally, Norris and Armstrong (pp. 43-51) note the use of CCTV surveillance in residential areas, schools, banks, shops, workplaces, hospitals, schools, and train stations, as well as to regulate automobile traffic and police football stadia. The ubiquity of CCTV in Britain has lead to authors to conjecture that for a British urban dweller it is nearly impossible to move through public and, to some extent, private space without being photographed and recorded (Norris & Armstrong, 1999, p. 2). Increasingly these systems are being automated to work with face recognition software to look for "known" individuals and track their movement from camera to camera throughout the network.

While CCTV surveillance is directly concerned with the local observation of movement, the rise of dataveillance is critical for the observation of what Lyon refers to as "disappearing bodies" (Lyon, 2002). As transactions occur over longer distances, often with the aid of information and communication technologies, the physical body "disappears" and is replaced with personally identifiable data that represents the individual (Gandy, 1993). Mecha-

nisms such as security numbers, banking codes, and telephone numbers are recorded to provide a record of the interaction, which is often stored in computer databases. This information can be mined and analyzed by software using sophisticated algorithms to detect information patterns and assign a relative value to an individual, or what Gandy refers to as the "panoptic sort."

Automation through the employment of information and communications technologies and advances in surveillance hardware and software have expand the scope and speed of surveillance systems, enabling these systems to increasingly observe and record real-time activity and physical mobility at often exceptional distances. The growing reliance on information and communications technologies to conduct and coordinate surveillance has lead to the increasing importance of codes in the surveillance process (Lyon, 2003b). Codes are not only critical for the efficient operation of computerized systems, but they are also embedded with politics (Lessig, 1999). Programming establishes the rules that guide the functioning of computer codes, determining what information is stored and sorted, which individuals are tracked, and whose data-profile is flagged for review. To this end, the choices that are made during the programming and implementation of surveillance systems generate the set of laws that govern the operation of those systems.

In the wake of the September 11th attacks on New York and Washington, DC, the U.S. government has been on the forefront of bureaucratic uses of mobile surveillance technology and systems. Examples include the recently discontinued Terrorism Information Awareness (TIA) program (formerly Total Information Awareness) that was under development by the Defense Advanced Research Projects Agency (DARPA). The goal of the program was to preempt terrorist attacks by examining a variety of independently collected data sources in order to build comprehensive data profiles of potential terrorists. To accomplish this goal, DARPA was developing software that would have enabled intelligence officials to mine a virtual database that would consist of government, financial, education, medical and housing records from around the globe (Swartz, 2003, p. 6). Although the program was later abandoned, extensive data collection and data mining operations will almost certainly continue to be developed by national governments wishing to hedge against the risks inherent in an increasingly globalized world characterized by global flows of information, finance, and population (Castells, 1996).

## FUTURE TRENDS

In *Surveillance After September 11*, David Lyon (2003a) provides us with three key issues that have emerged during the U.S.-lead "war on terror," namely suspicion, secrecy, and the mobilization of citizens as spies. He asserts that suspicion has been harnessed by local and national governments to broaden the scope of who may legitimately become a target of state-sponsored surveillance, while also being used to justify the secrecy of new or enhanced surveillance regimes under the rubric of "national security." Finally, the culture of suspicion that has arisen in the U.S. and to varying degrees in other societies around the world has increased acceptance for enhanced surveillance activities.

Mobile surveillance must be viewed through the prism of Lyon's three-part schema. If the culture of suspicion persists as a major motivating factor in bureaucratic implementation of enhanced surveillance capabilities, we can expect that new mobile surveillance technologies will be at the forefront of research, development and implementation, as they provide authorities with the ability to track and sort individuals and populations in real time. In the wake of the September 11 attacks, and the subsequent string of attacks around the globe including the bombings in Madrid and Bali, a number of national governments have made upgrading their surveillance capabilities a priority. Additionally, technological advances will decrease the need for the human supervision of surveillance systems, creating a fully automated surveillance apparatus.

Three technologies in particular will enhance the surveillance capacity of the bureaucratic organization in the future: GPS, RFID, and biometrics. The inclusion of GPS receivers in mobile phones, often at lawmakers' request to provide assistance in locating missing individuals, allows for monitoring the precise location of the phone in real time, whether a call is being made or not. RFID tagging, a bonus for merchandisers keen to increase logistical efficiency, is also an ideal technology for bureaucratic management. It will likely become a permanent feature of future identification cards, as the miniaturized tags are capable of storing personally identifiable information and transmitting it wirelessly to strategically placed receivers in airports, and other access-restricted locales. Finally, biometrics, the practice of identifying an individual based on physiological characteristics, seems poised to be the next big field of personally identity. Coupled with optical surveillance, biometrics can be used to further automate CCTV systems, providing a reliable method for identifying individuals.

Serious questions must be asked about the architecture of current and future systems and the codes that govern them. Who is being tracked, how they are being tracked, and why they are being tracked are important design questions that will influence human outcomes. While it is hard to argue against the use of efficient systems that enable authorities to prevent a small hand-

ful of individuals from doing great harm to large number of innocent people, a balance must be struck between the rights of the individual and the safety of the majority. Many nations have a legal and legislative framework in place to wrestle with balancing these two responsibilities. However, the push for secrecy inspired by a climate of suspicion may be the single greatest variable to consider when examining the future of surveillance. A move toward greater state secrecy serves to obscure the existence and operation of the surveillance apparatus, limiting transparency, and diminishing the possibility of legislative and public oversight.

Looking forward, it is important to remember that technological development must be coupled with legislative action and social awareness. State sponsored surveillance that is designed to protect the public from harm should be at least minimally transparent and ideally subjected to oversight in order to protect against abuses. Technological advances in data gathering, sorting, storage, and retrieval, coupled with complimentary advances in computing and mobile ICTs will enhance the surveillance capacity of large organizations. They will be increasingly able to tap into vast stores of personally identifiable information from multiple sources through refined data-mining practices.

## CONCLUSION

The regulatory framework in which these organizations operate will help determine which surveillance practices are available to the state and which are not. Legislative bodies will need to set guidelines that simultaneously encourage technological growth and positive uses of surveillance, while demanding state accountability and balancing the rights of the citizen and individual to privacy. Despite increasing globalization and surveillance regimes aimed at minimizing the risks that arise from global population flows, it is import to remember that concept of privacy and privacy regulations vary greatly from state to state. A patchwork of laws governs the surveillance of globally mobile bodies, as individuals pass borders and therefore into and out of the gaze of the state surveillance apparatus. Post-September 11th agreements between nations have lead to greater international security cooperation and information sharing, subjecting the actions of citizens of one nation to the gaze of another. What right to privacy does the global citizen have from the government of a foreign nation, for whom he or she cannot vote?

The ability of the citizenry and legislatures in democratic nations to oppose, alter, and eliminate surveillance regimes should not be underestimated. Despite an intense "culture of suspicion" following the September 11, U.S. citizens and lawmakers were able to halt two of the more controversial government programs designed to enhance the nation's surveillance capacity. A key surveillance passage of the USA PATRIOT Act, which granted federal authorities almost unchecked power to collect personally identifiable data, was struck down as unconstitutional by the courts, and the Terrorist Information Awareness (TIA) program, which was attempting to build highly advanced data-mining software to cull vast amount data in order to build predictive models of terrorist behavior, had its funding denied by the Congressional committee charged with its oversight after intense public scrutiny. These two local successes do not signal a victory for transparency and oversight, but rather point to a possible trend of ad hoc coalitions formed to resist specific instances of particularly intrusive state surveillance.

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## KEY TERMS

**Biometrics:** Biometrics is the science and practice of verifying individual identity based on the analysis of unique physiological or behavioral characteristics. Examples include the analysis of fingerprints, retinas scanning, voice pattern analysis, facial patterns, and analysis of an individual's walking gait.

**CCTV:** Closed Circuit Television is a technological system of video surveillance that employs a closed network of cameras to provide a visual observation of a targeted area. CCTV has been used extensively in high crime areas not only as a means of fighting crime but also as a deterrent. The use of CCTV is increasingly being combined with face recognition software to create automated video surveillance networks that can operate with limited human interaction.

**Data Mining:** Data mining, also known as knowledge discovery in databases, is the practice of extracting targeted information from large databases through the use software technology utilizing algorithms to detect patters.

**Face Recognition Software:** A software package that is designed to identify individuals in crowds based on distinguishing facial characteristics. This software must be used in conjunction with visual surveillance systems such as CCTV. The facial characteristics of target individuals are loaded into computer systems that analyze the visual data captured by the visual surveillance apparatus and alter system users when a target individual is spotted.

**GPS:** Global positioning system is a satellite navigation system that is able to provide extremely accurate time and position data through the tracking of user-held receivers. The system was developed and maintained by the United States Department of Defense and is available free of charge to nonmilitary users. The system operates through transmissions between user-held and earthbound receivers to a network of satellites, whereby a receiver's exact location is determined through the process of trilateration and time is determined by the coordinated atomic clocks of the satellites.

**Identity Documents:** Identity documents take many forms from drivers licenses to passports to national identity cards. These cards are government issued documents that contain personally identifiable information often including a photograph, date of birth, place of residence, gender, physical characteristics such as height, weight, and eye and hair color, and include a unique identifier number specific to the card holder. Increasingly identity documents include personal information encoded in magnetic strips that can be read through the use of a scanner.

**RFID:** Radio frequency identification technology is a type of wireless automatic identification system that collects data and transmits it directly to a computer database using radio waves. A typical RFID system consists of a radio frequency tag that transmits identifiable data when in proximity of a reader that is then recorded to a database.

# From E-Government to E-Democracy in China

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## INTRODUCTION

Endowed with 5,000 years of ancient tradition and heritage, China is reputed as the single oldest uninterrupted civilization in the world. Ancient Chinese made great contributions to mankind by the invention of the compass, gunpowder, papermaking, and printing, which are recorded in history as the Four Great Inventions. For centuries, China has been one of the world's most technologically advanced civilizations and the most dominant cultural influence to the East Asia region.

In the 21st century, China's resurgence as one of the preeminent powers brings worldwide attention. With its population of nearly 1.3 billion, its expansive territory, and its huge market potentials, China's modern development will continue to benefit the world, just as it did in ancient history.

Today, science and technology long have preoccupied China's policymakers, and there is an urgent need for China to wield modern information and communication technology (ICT) in order to reinvent government regime. However, the legacies of thousands of years of feudalistic tradition and the ideological control over the Mao era, which lasted for nearly three decades, make it difficult to revolutionize the country's governance system promptly. Therefore, the Chinese government had to adopt a gradual and steady approach toward social democratic reform. Through this process, e-government projects play an important role; for example, a national electronic audit network has given impetus to China's fiscal transparency and public expenditure management.

This article is organized as follows: First, there is a brief historical retrospect of China's cultural background; second, there is an introduction of current main e-government projects in China; finally, upon the analysis of the progression of fiscal transparency in China, an optimistic expectation of China's future e-government and e-democracy is given.

## BACKGROUND

China has a long and rich cultural tradition in which education has produced great impacts. Since ancient times, Chinese people have been educated to believe in three dominant religions—Confucianism, Taoism, and Buddhism—among which the most influencing one was Confucianism, which not only influenced people's attitudes toward life and set patterns of living and standards of social value, but also provided a solid background for China's political theories and institutions. The ingenerate hypostasis of Confucianism is worship of heaven. Pursuant to the theory of Mencius, the continuator of Confucius, heaven was considered to have strong will and intention; it can reward or punish men and women according to their behaviors. The ruler, or the emperor, is the Son of Heaven; he is the supreme person appointed by heaven, and therefore, it is heaven who is the support of an emperor's authority (Dainian, 2002). Confucius never taught people of his age any basic ideas of people's rights against tyranny, the nature of human beings, and so forth. One of Confucius' apothegms in his famous book *Analects* is that common people can be made to follow the way; they cannot be made to understand the way (Confucius, 1998). By saying so, Confucianism teaches that a distinctive hierarchy of family, society, and state can bring harmony to the world, where everyone has peace, order, and discipline, which, in turn, will result in material prosperity for both the state and its people.

Taoism, the second influencing ideological thought in China, highlighted the harmonization of man and nature by emphasizing that the world is perfect and that people cannot improve it. The central theme of Taoism is"action by non-action," or "doing nothing"; that is, nothing strained, artificial, or unnatural. Man should act naturally upon object principles instead of imposing his subjective judgment on other people and external things. Man should be free from space and time, from worry and care, and from entanglement with politics and bureaucracy. Hence, through spontaneous compliance with the impulses of one's own essential nature and by emptying oneself of all doctrines and knowledge, one finally can achieve harmonization with heaven and can transcend all mundane distinctions (Tzu, 1998).

Differing from Western civilization, which originated from the Athenian democratic tradition of ancient Greece, China's historic and traditional background implied little democratic and transparent elements; ordinary Chinese people were not entitled to the basic right of participating in government affairs. From another point of view, China's history is characterized by repeated divisions and

reunifications amid alternating periods of peace, war, and violent imperial dynastic change, which made the leaders of every dynasty by and large neglect people's voices and rights. During the period of the Culture Revolution from 1966 to 1976, this situation reached an extreme level.

## E-GOVERNMENT PROJECTS IN CHINA

A number of potentially significant events occurred after China adopted the open door and economic reform policy in the latter 1970s; since then, China has made great progress toward integration with world social and economic development. Encountering the age of information technology, the Chinese government has been investing actively in the technology of the Internet and has been encouraging its usage for the purpose of capturing the potential commercial value, while engaging in e-government construction so that scientific and technological achievements can be turned into practical productive forces as soon as possible and can enhance the spreading and application of high technology and mature technologies (China Internet Information Center, 2004). One of the great achievements is a series of national e-government projects that have been implementing gradually and steadily in government agencies and geographical regions. The e-government projects consist of two parallel stages through a top-down approach: one is the Government Online Project (GOP); the other is the so-called Golden Projects. According to Chinese ancient tradition, golden color is noble and auspicious, and the use of the color was restricted only to some special occasions. Giving the name Golden Projects to e-government projects indicates that the Chinese government has attached great importance to the projects and has made a strong commitment to carry them out (Ling, 2004).

The Government Online Project was scheduled to take place in three phases:

- **Phase One: Enabling Technologies:** Focused on connecting 800 to 1,000 government offices and agencies to the Internet.
- **Phase Two: Information Sharing:** Aimed at having government offices and agencies move their information systems into compatible electronic form.
- **Phase Three: Paperless Government:** Planned to occur sometime in the future, when government operation will be based on digital processing and totally free from paper works. The purpose of the GOP is to create a centrally accessible administrative system that collects and transports data to and from users, who are supposed to be the public and the enterprise as well as government departments. By official statement, the GOP will pursue the following:
  - Provide more effective coordination between and across government organizations, both horizontally (among ministries) and vertically (from center to locality)
  - Build up national and worldwide confidence in the Chinese central and local governments' presence on and commitment to the Internet.
  - Make available to the public government information while also reducing government expenses by increasing administrative efficiency.
  - Lay a base for the establishment and growth of China's electronic government.
  - Encourage electronic procurement.
  - Begin to accelerate the acceptance and use of the information economy in China. (China Ministry of Information Industry, 2000)

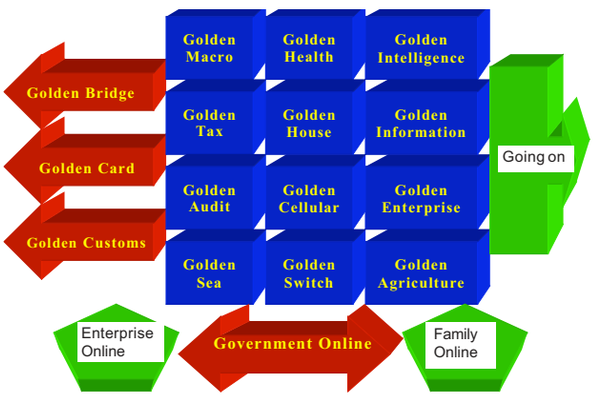
The Government Online Project was launched formally in 1999; by the end of 2000, about 80% of all government agencies, both local and national, had established their Web sites on the Internet. Following the Government Online Project, it has been the Enterprises Online and Family Online Projects. Nowadays, government Web sites offer a great range of information, from introductions of departmental functions and state and local laws and regulations to information about tax payments and project bids. After the sudden outbreak of the SARS (Severe Acute Respiratory Syndrome) epidemic in early 2003, the Chinese government had made great progress toward information exposure in reporting all paroxysmal epidemics and chronic diseases such as hepatitis B and C, schistosomiasis, tuberculosis, HIV/AIDS, and so forth, across the country on official Web sites in a timely and regular manner.

During the period of 1991 to 2000, China's government focused on another ambitious, comprehensive, and far-reaching e-government construction—the Golden Projects (see Figure 1). Since pioneering three key projects—the Golden Bridge Project, the Golden Cards Project, and the Golden Customs Project—a series of integrated Golden Projects, including intra-government communications, education, healthcare, medical research, and agriculture, has been implementing gradually and steadily in the country.

## FUTURE TRENDS

Although much of e-government is about the delivery of services and the government's dealings with the private

*Figure 1. Key golden projects in China (PRC)*




sector, there is another dimension to it. As the Industrial Revolution occurred in Great Britain but spread to other countries and altered global economy and society at the end of the 18th century, so China's present digital revolution also may exert a profound influence on the operation of government and on public sectors. It will not be ICT by itself that redirects and reshapes the functions of government and makes it somehow different or better than before, but ICT will enable government's internal and external communication to gain speed, precision, simplicity, outreach, and networking capacity and eventually to contribute to change governmental operation mechanism. In the same way, a silent but important revolution led by a series of well-planed, comprehensive e-government programs is taking place in China; e-government projects, indeed, act as a special kind of catalyst to e-democracy as well as good governance in this ancient country (Ling, 2004, 2005). It is the e-government projects that empower Chinese people to participate in and to monitor public affairs such as public revenue and expenditures. Government cannot build a fence around citizens or passively restrict them as mere consumers or customers of government services; those same citizens also are owners or shareholders of government itself.

A cohesive e-democracy progress generally is divided into several parts: e-participation, e-engagement, e-campaigning, e-voting, and so forth. Information disclosure by e-publishing is absolutely the precondition for all of the aforementioned e-activities. In China, such an e-project concerning information disclosure and public participation is the famous Golden Audit Project. The unprecedented e-government projects in the country had promoted China's political transparency, especially in the public finance sector, just by publishing and disseminating information to the public about government wrongdoings. Although the initiative efforts made by the Chinese government apparently should be regarded as in an infant stage in the long way of e-democracy, it did challenge the secret tradition and passive relationship between people and their government in Chinese feudalistic and absolute ideology and, therefore, manifests the steady progress and optimistic trends of China's social and political reform in the future.

In 2000, the China National Audit Office (CNAO) launched the Golden Auditing Project and kept improving it in tandem with other parallel e-government projects covering the fields of public finance, tax collection, customs duty, social security, and so forth. The project is aimed at establishing an auditing information system that will ensure the effective monitoring and supervision of government revenue and expenditures through a new online auditing model (Deming, 2003). According to the Constitution and the Audit Law, the CNAO is directly under the leadership of the Premier of the State Council, taking charge of government audits nationwide. The CNAO is responsible for the following (CNAO, 2004):

- Auditing budget implementation, final accounts, and management, and use of off-budget funds of departments at the corresponding levels and governments at lower levels.
- Auditing assets, liabilities, profits, and losses of state-owned monetary organizations and state-owned enterprises.
- Auditing revenues and expenditures of state non-profit undertakings.
- Auditing budget implementation and final accounts of state construction projects.
- Auditing revenues and expenditures of projects with assistance or loans provided by international organizations or foreign governments.
- Auditing state-owned enterprises that are vital to the national economy and to people's livelihoods

and receiving large entitlements from the government or suffering substantial losses as well as other state-owned enterprises designated by the State Council or corresponding local people's governments.
- Auditing special funds, such as Social Security funds and agricultural development funds.

Every year, audit institutions at various levels should present reports on the audit of budget implementation and other revenues and expenditures of public finance to the standing committees of the people's congresses at their corresponding levels. Their audit scope should cover the following areas:

- Implementation of the central budget, other revenues, and expenditures of public finance.
- Revenues and expenditures of central departments, non-profit undertakings, and their subordinate units.
- Budget implementation and final accounts of provincial people's governments.
- Revenues and expenditures of the Central Bank, assets, liabilities, profits, and losses of central monetary institutions.
- Revenues and expenditures or central government-owned enterprises and enterprises where state assets dominate or predominate.
- Revenues and expenditures related to funds managed by relevant departments of the State Council.
- Revenues and expenditures of projects with loans and assistance from international organizations and foreign governments.

One of the significant advances to promote fiscal transparency by the Chinese government is to release the full text of its auditing reports to the public through CNAO's Internet Web site (http://www.audit.gov.cn). Before the year 2003, the CNAO only issued full reports to the State Council and to the National People's Congress by keeping full audit texts secret to the public, or it only had some abstracts published sporadically in some occasions. The first open budgeting audit report issued on June 25, 2003, and based on a great number of auditing data focused on the budget process of the 2002 fiscal year and sharply criticized some improper activities of the Ministry of Finance, state-owned banks, large state-owned enterprises, and some other ministries. For instance, the report exposed serious problems ranging from the Ministry of Finance's mishandling of pension funds to fraudulent loans granted by dozens of local branches of the China Construction Bank. According to this audit report, financial malpractice was discovered at 41 of the 55 surveyed departments in the central government and its affiliates. The misused money amounted to 1.4 billion yuan (US$170 million) in 2003's budgeting period; the situation is so serious that even emergency funds earmarked for disaster-relief programs were defaulted. The data show that during the years between 1983 and 2003, when the CNAO was established, it has examined more than 3 million institutions throughout the country and has exposed extensive misuse of public funds by some government departments, seized illegal and suspect funds worth 130 billion yuan (US$15.7 billion) (Xinhua News Agency, 2004).

The release of the national audit report via an e-government project drew wide media attention like a thunderbolt. The results of auditing, transmitted promptly by numerous media outlets, consequently shook the whole country and resulted in a so-called Audit Storm in this traditional nation and among its docile citizens. Meanwhile, the Audit Storm has been sweeping rapidly from central to local levels; for example, in Guangdong, a southern province, local delegates of the congress for the first time seriously checked and ratified the budget report of the province. They noticed that four kindergartens affiliated with government agencies, which were reserved for children of government employees, were allocated more than 20 million yuan (US$2.41 million); thus, delegates demanded an explanation of why taxpayers' money should be used to raise civil servants' children without approval or without even informing taxpayers. Other problems detected by the local audit body and delegates include the lack of a feasibility study before commencing a constriction project, poor accounting, inadequate management, shortcomings in bidding processes, low efficiency, legal violations, and so forth (Xinhua News Agency, 2004).

Spurred by the process of open budget and fiscal transparency, the fight against corruption has intensified in recent years. The Supreme People's Court of China, the juridical section of the government, also has been playing an active role in safeguarding the country's financial security, protecting the growth of non-public economic sectors, maintaining a sound market economic order, and ensuring fair market competitions. In 2003, Chinese courts at all levels concluded investigations into 5,687,905 cases that involved a sum of 768.5 billion yuan, and six former ministerial-level officials were sentenced on charges of job-related crimes. The penalties on them ranged from death sentence with a reprieve to life imprisonment and 12 to 15 years behind bars, according to China's chief justice report (Xinhua News Agency, 2004).

On October 20 2005, the China State Council Information Office published a white paper entitled *Building of Political Democracy in China*. The document, composed of 10 chapters, gave a detailed account of the inception, development, contents, and principles of the country's political democracy. It also emphasized the basic stand by

which the country will abide and pointed out the problems that the country has to overcome and major steps to be taken in the reforms of its political system. The white paper on political democracy is an important signal for the coming of e-democracy in China.

## CONCLUSION

The transition process from e-government to e-democracy involves a number of complex government changes, among which the most important reform for China lies in the fundamental transformation of its public finance regime from a secret tradition that has lasted for centuries into a modern democratic open process. Scholars have suggested that the government-citizen relationship should bring together both top-down and bottom-up approaches with three types of interaction: one-way information provision; two way consultation relationship, where citizens are given the opportunity to give feedback on issues; and active participation, by which citizens are dynamically engaged in policymaking (OECD, 2003). Following this logic, e-government performance is edging up in China; the progress seems very small through the eyes of people from democratic nations, but it is, indeed, a great leap forward from its ancient feudalistic tradition and formerly ideological control practice. Fiscal transparency via an e-government project will usher good governance and e-democracy into this ancient country.

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## KEY TERMS

**Active Participation of E-Engagement:** Refers to a relation based on partnership with government, in which citizens actively engage in the policymaking process. It acknowledges a role for citizens in proposing policy options and shaping the policy dialogue, although the responsibility for the final decision or policy formulation rests with government (OECD, 2003).

**One-Way Relation of E-Engagement (Information Stage):** Refers to a relation in which government produces and delivers information for use by citizens. It covers both passive access to information upon demand by citizens and active measures by government to disseminate information to citizens (OECD, 2003).

**The Cultural Revolution:** A political movement launched by Chinese Communist Party Chairman Mao Zedong during his last decade in power (1966-1976) in order to renew the spirit of the Chinese revolution. Fearing that China would develop along the lines of the Soviet model and concerned about his own place in history, Mao threw China's cities into turmoil in a monumental effort to reverse the historic processes underway.

**Two-Way Relation of E-Engagement (Consultation Stage):** Refers to a relation in which citizens provide feedback to government. It is based on the prior definition by government of the issue on which citizens' views are being sought and requires the provision of information (OECD, 2003).

## APPENDIX



**Confucius 1**

**Confucius** (c. 551-479 B.C.). Chinese philosopher and one of the most influential figures in Chinese history, he is honored as a great teacher and sage in China. Confucianism, his philosophy, is a major system of thought in China and is concerned with the principles of good conduct, practical wisdom, and proper social relationships. The principles of Confucianism are contained in the nine ancient Chinese works handed down by Confucius and his followers, who lived in an age of great philosophic activity. Politically, Confucius advocated a paternalistic government in which the sovereign is benevolent and honorable, and the subjects are respectful and obedient. He enjoined all individuals to observe carefully their duties toward the state. In subsequent centuries, his teachings exerted a powerful influence on the Chinese nation.

**Confucius 2**

***The Analects,*** a book by Confucius that records all of the "Confucius-said" aphorisms, was compiled by his students after his death. Because *The Analects* was not written as a systematic philosophy, it contains frequent contradictions, and many of the philosophical doctrines are ambiguous. *The Analects* became the basis of the Chinese social lifestyle and the fundamental religious and philosophical point of view of most traditionalist Chinese intellectuals throughout history.

**Confucius 3**

**Mencius 1**

**Mencius** (c. 371-288 B.C.), Chinese philosopher and successor of Confucius. After studying the philosophy of Confucius, he traveled for years expounding Confucianism and lecturing rulers on their duties toward their subjects. He believed that the power to govern comes from God and should be exercised in the interests of the common people. He spent the latter part of his life in seclusion with his disciples. In his teachings, he stressed the belief that people by nature are good, but that this goodness becomes manifest only when they experience peace of mind, which, in turn, depends on material security. If rulers, therefore, reduce their subjects to poverty and selfishness, they should be deposed. Since the 11th century, Mencius has been recognized as one of China's greatest philosophers; the *Mencius* (*Book of Mencius*) is regarded as a basic Confucian text

**Mencius 2**

**Lao-tzu 1**

**Lao-tzu** (570?-490? B.C.), Chinese philosopher and reputed founder of Taoism. He is the author of the *Tao-te Ching* (*Classic of the Way and Its Virtue*), a philosophical treatise. By far the most translated Chinese literary work, this small book has had an enormous influence on Chinese thought and culture. It teaches that "the way" (*tao*) is realized through recognition and acceptance of nothingness; that is, wisdom is understanding that weakness truly equals strength, that happiness depends on disaster, and that passivity is the greatest action

**The Eight Diagrams (Taoism)**

**Taoism.** Chinese philosophical and religious system dating from about the 4th century B.C. Among native Chinese schools of thought, the influence of Taoism has been second only to that of Confucianism. The essential Taoist philosophical and mystical beliefs can be found in the *Tao-te Ching* (*Classic of the Way and Its Power*), a composite text dating from about the 3rd century B.C. and attributed to the historical figure Lao-tzu. Whereas Confucianism urged the individual to conform to the standards of an ideal social system, Taoism maintained that the individual should ignore the dictates of society and seek only to conform to the underlying pattern of the universe

# From E-Government to E-Governance

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## INTRODUCTION

The purpose of the present article is twofold: (a) to support the definitions of e-government (eGvt) and e-governance (eG) based on content (and not on technology only); (b) to analyze the relationship between eGvt and eG.

## DEFINITIONS

Every socio-economic system (SES) (e.g., a country) includes a societal governance subsystem. This subsystem refers to the activities of the central, regional, and local state institutions of the Executive, Judicial, and Legislative Authorities. It has an important role in determining the legislative, judicial, fiscal, and other public services environment within which citizens, households, institutions, businesses, and NGOs (elements of the societal operational subsystem) live or function.(The societal governance tasks referring to relationships with other SESs is not discussed here, in order not to complicate the analysis. However, this does not impact the generality).

In the circumstances of building the Information Society, the societal governance uses advanced information and communication technology (ICT). The terms government online, online government, and digital government (DG) are proper to characterize this category of governance, as opposed to the traditional governance based on "paper and pen technology." (Because of the long tradition, the "bureaucratic culture" is still strong. It explains the presence of still existing "computerized paper and pen technology based" public information systems. They are sometimes called "insular information systems". However, many times the term "eGvt" is also used in the generic sense of "informatized governance."

## SHORT HISTORICAL PERSPECTIVE

In the 50s, a rapid expansion of the use of digital computers in practical every field of human activity started. The defense (such as weapon research or U.S.'s Strategic Air Command) was the first field using advanced ICT. Nonmilitary applications of computers started with such applications as the U.S. Census of 1951 and first computerized management information systems designed and implemented by large U.S. companies (General Electric, Du Pont de Nemours, and Honeywell to name a few). Computer process control and electronic data processing (EDP) were recognized as two fields of applications. EDP was organized in "computer centers," hosting mainframes with very small "fast" memories, small disks and "large" magnetic tape memories and archives. The centers had large GP (girl power) operators for punching cards read by the computers, groups of analysts for understanding user requirements and converting them into specifications and many programmers who converted the specifications into application software. Proprietary operating systems, assemblers and other compilers for widely accepted programming languages (such as FOTRAN and COBOL) were used. New fundamental concepts appeared, such as database—the core of integrated information systems; databank—storing easy retrievable structured information; structured programming. To some mainframes, typewriter or video terminals and/or remote job entry units were connected, using public (possibly hired) or local telecommunications lines. Unitary ranges of computers (such as IBM 360, GE 400, ICT 1900, CDC 6000, to name a few) appeared on the market in the mid 60s. The software industry began to grow rapidly offering utility software, application software and application software systems as "dematerialized" industrial products. The role of the electronic computer for development was officially recognized in the late 60s, when the UN General Assembly adopted a resolution in this sense. (UN, 1968). In some of countries, ICT development programs were adopted. In the UK, ICT (International Computers and Tabulators) and English Electric-computers merged to form ICL. France adopted "Plan Calcul." Romania adopted also an ICT development program, independent of the "Unitary Series" of the "socialist block" which tried to follow IBM, but with increasing lag). An attempt to build a merged Western European computer industry ("Unidata") failed.

Computing centers where also established to serve central and local state institutions. The French public administration created many years ago the first version of the SIRENE register of organizations. It was an interministerial project (Ministry of Finance, Ministry of Labor and INSEE—as a neutral data administrator), needed for macroeconomic planning. In the early 90s, Denmark had a remarkable example of eG (even if this term was still not

*Table 1. E-government definition in the eEurope program*

| Service | Level of service |
|---|---|
| **For Citizens** | 1—Online information about the service |
| 1—Income tax | 2—Downloading of forms |
| 2—Job opportunities | 3—Interactive submission of forms (including authentication and acknowledgement) |
| 3—Social security payments | 4—Full transaction, including full case handling, decision, and payment (if applicable) |
| 4—Personal documents | |
| 5—Automotive vehicle registration | |
| 6—Authorization of construction | |
| 7—Police declarations | |
| 8—Online library (catalogues, search) | |
| 9—Certificates (e.g., birth, marriage) | |
| 10—University student registration | |
| 11—Change of address | |
| 12—Health | |
| **For Organizations** | |
| 13—Contributions to social security | |
| 14—Declaration and notification of taxes | |
| 15—VAT declaration, notification | |
| 16—Registration of a new company | |
| 17—Statistical reports | |
| 18—Environmental permit | |
| 19—Custom declarations | |
| 20—Public acquisitions | |

in use). The initial government's computing center of the 60s became the state-owned "DataCentralen" company, hosting the population register, the trade business register, the cadastral database, and other databases. Terminals were connected to local area networks of central and local state institutions and these were connected via a wide area network to DataCentralen. Various applications included recording of personal events (such as births), an iterative elaboration of the draft central and local budgets etc. Denmark renounced in the 80s to produce the 10 years national population censuses, processing instead data from the population register and other databases. Danish legislation become supported by a dynamic macroeconomic model (Dam, 1986) and a socio-economic database application (Ekonomiministeriet, 1991) for the simulation of the likely consequences of proposed normative acts. The Danish Data Authority provided the necessary personal data protection. Well defined delegation of Authority between central and local institutions, use of unique identifiers and also the "Kommunedata" local computing centers, were important factors for the success of large integrated information systems. Information integration, information interchange, computerized back-office and front office, central databases, and servicing of citizens and organizations as well as civil servants and other users became specific keywords.

It took nearly a third of a century of accelerated technical and technological progress, to develop: industrial relational databases, PCs, and digital high speed communications. Information technology (IT) and communications technology (CT) merged into ICT. Mobile telephony, high-speed computer networks, and digital content industry flourished. PCs, Internet, and Web services brought information and "computer utility" directly to the user. The Information Society concept was introduced in the early 80s. (Masuda, 1980) and gained gradually wide support. In 2003, UN World Summit on Information Society took place. Masuda advocated also the idea to improve relationship between public institutions and the public.

The term "online government" appeared in the mid 90s, as set of e-services, component of a program recommended by the special G7 session for Information Society at the beginning of the present century, EU selected, for benchmarking "e-government," 12 e-services for citizens and eight e-services for businesses (in the framework of the eEurope program). Four service levels were defined. (The low service levels could be created acting at the front-offices only, whereas the levels 3 and 4 implied also the back-offices and their possible integration—see Table 1). This definition by enumeration is precise, but has a limited scope.

The Japanese government underlined the keywords: disclosing government information, making greater use of IT and protecting personal data, with the goals of providing user-oriented services, simplify public administration and increase budget efficiency (Takano, 2004).

However, broader views also developed, for example, the first EU program for Information Society (Bangemann, 1994) included the project for a Trans-European Network, connecting the European administrations. It became the operational IDA (inter-communication between administrations) project to be developed as IDABC (interoperable delivery of European e-government services to public administrations, businesses and citizens—see EC-2, 2005). One of the first classic papers on e-government (Lenk &

Traunmueller, 2000) put the accent on: citizen, process reengineering, cooperation, and knowledge management in the public administration. In Lenk and Traunmueller (2002), the scope broadens to include democratic policy formulation, its implementation and evaluation of the results for permanent improvement. A point of view of the business community on e-Gvt was presented (Moriuchi, Cisneros, & Danish, 2001) as the state in which the internal and external operations of the executive, judicial, and legislative institutions are informatized and networked in order to provide high quality public services. An e-government project (OECD, 2001) uses a similar point of view: the application of modern ICT to the full range of government functions, enabling the adoption of good governance practices. It was followed by a "Checklist" (OECD, 2003). The World Bank "info Dev e-Government Handbook for Developing Nations" (Khalil, Lanvin, & Chaudry, 2002) defines e-government as the use of ICT to transform government in the sense of accessibility, accountability, and effectiveness. Papers using the expression "From e-Government to e-Governance" (e.g., Glassey & Chappelet, 2003; Traunmueller, 2003) showed the trend to informatize and integrate the services of all the three Authorities (Executive, Judicial, and Legislative). Reinermann and von Luecke (2001) started by noticing the similarities between "governance" and "management" in the cybernetics sense and their applicability in every sector of the SES, including state and administration, economy, NGOs as well as population, all being influenced by the advance of the ICT. They distinguished "e-governance in a narrow sense" as oriented on the public sector (including "e-government" as the informatization of its business processes) and "e-governance" as the general governance in the Information Society. Yoshimura (2003) defines: (a) e-government as using ICT for transforming relationships of the government with citizens and businesses by improving its services and reducing transaction costs; (b) e-governance as using ICT for improving transparency, accountability, access to public information including building opportunities and enabling interaction with government officials. The possibility of improvement of governance by creation of new informational feedback circuits was also suggested (Costake, 2001). It seems that the initial interest on DG seen as the informatization of the core activities of the public institutions, shifted to public e-services and is now evaluating towards a broader scope, covering both previous points of view. Though reflecting a large diversity, this trend can be also observed in the information regarding e-Gvt strategies, as reported to the EU's "eGvt Observatory" (EC-1, 2004) (e.g., some advanced European countries include wider objectives, such as contribution to the competitiveness of the national industry (ICT industry included) or shared applications such as document and content management).

## BRIEF COMMENTS ON TRENDS IN THE THREE AUTHORITIES

The international experience in digital government progresses at the level of the executive, legislative, and judicial authorities.

The use of ICT in the *legislative authority* progresses in the following directions: (a) informatization of the workflow to generate the normative acts, with the by-product of updating an official legislative database; (b) development of the infrastructure for e-Democracy (e.g., Chutimaksul & Funilkul, 2004; Tiecher, Hoeschl, & Zimath, 2003); (c) use of specific software tools for legislative acts generation such as XML or POWER (van Engers & Vanderberghe, 2002); (d) integrated information systems for storing and accessing legislative information, such as Normeinrete (Lupo & Batini, 2003). Legal framework for DG is discussed by Saarenpaa (2003 and 2004).

In many countries, the informatization of the *judicial authority* means the change from a possibly effective if correctly used old traditional information system based on handling paper documents, to a performant modern computerized information system, using electronic documents and electronic archiving. Following directions an be identified: (a) general case and documents database making possible (i) the follow up of a case through the various judicial units and (ii) quantitative definition of coherence of the judicial solutions and system performance (such as suggested by Costake & Galindo, 2004); (b) improving the service provided to the public (query for document archives, access to the judicial solutions, etc.); (c) improving the activity within the judicial units as a reesult of using electronic documents and the access to the general case and documents datatbase (e.g., Ko & Gabor, 2001); (d) transfer of electronic documents between judicial units at national and international level, such as EQUITAS project (Diez & Prenafeta, 2002) and integration with the Notariate's Information System; and (e) new communication means with attorneys, etc.

Because of the many and diverse activities of the Executive Authority at international, central, and local level, their informatization presents many aspects and problems. (see Gupta, Kumar, & Bhattacharya, 2005). One may, very briefly indicate some few representative examples of trends: (a) integration of the information system, together to managerial changes (Millard, 2002, 2004); (b) maximizing performance/cost ratio by Public-Private Partnership; e-Governance information system architecture at central, regional, and local level (Arcieri, Cappadozzi, Nardelli, & Talamo, 2001; Fischmann, Jakisch, & Riedl, 2001; Virili, 2001) to quote very few authors.

## FUTURE RESEARCH OPPORTUNITIES

A number of future research opportunities were proposed (see *General Requirements for Digital Government*). Another three can complement them.

### eG Support for Decentralisation of the Decision

The decentralization of the decision is a major governance trend. In the majority of the EU member countries, the ministries and the other government bodies at one hand and local authorities on the other implement a general strategy. The complexity of the local governance is not far from the one at central level and many achievements exists at locality and other territorial levels. Coordination is necessary, at least because the existence of: (a) shared resources (e.g., natural, communications, etc.); (b) bordering problems; (c) the obvious need that the level of the net taxation (central + local taxes) should not differ too much between various administrative-territorial. Optimal managerial, informational, and technical solutions are needed.

### Feasible Optimal eG Solutions for Accelerating Economic Growth and Employment

Growth and employment are needed to avoid the danger of installing digital divide within and between nations. A number of provisions of Universal Declaration of Rights imply costs per capita, which are difficult, (if not impossible) to meet, for example, under a certain level of GDP per capita and, perhaps, a certain value of Gini's coefficient. Growth and employment may also imply a design, based on identifying and/or creating, modeling, and enforcing automatic virtuous societal closed loops (including for democracy, competition and protection against fraud, corruption, and terrorism). These could be elements of an optimal eG theory.

### Net Benefits of eG

With the exception of e-public procurement, relative few economic net benefits of eGvt were reported. It is to be expected that major net benefits will be achieved by improved macroeconomic decisions concerning governance, including anti-fraud and anti-corruption actions.

## CONCLUSION

Two categories of DG can be observed:

a. DG Oriented on Provision of E-Services to the Population and the Organizations of the SES: (i) recording and archiving of events, properties and other states; (ii) supporting specific transactions such as tax declaration and payment, authorizations permits etc; (iii) offering multi-channel access to public information; (iv) promoting e-commerce via e-public acquisitions; (v) promoting e-democracy. These e-services imply mainly the executive authority. As the typical institution of the executive authority is the government, they can be named "eGvt." eGvt is focused on front-end activities. As it has good visibility, it presents also high political importance.
b. DG oriented on maximizing the performance of the socio-economic development of the SES based on Law, democracy, free market economy, competition, and a given level of social cohesion. (This goal implies re-engineering the governance, starting by rising its own performance, which implies also use of ICT as a support for informational integration and public e-services).The scope of this category of governance covers all the activities of the state, including: legislation, solving claims, fraud and crimes, public order, education, social security, public transport, public utilities, management of public financial, material and natural resources and property (including development of infrastructure), anti-corruption and anti-terrorist protection, defense, development of international relationships, strategic options and strategic planning of the socio-economic development etc. It seems natural to name this category as "eG."

*The performance of the of societal governance subsystem* can be characterized in terms of effectiveness for citizens and organizations, cost for the taxpayers and revenue for the central and local state budgets. *The performance of the governance (and eG)* can be characterized by key performance indicators of the socio-economic development (*see General Requirements for Digital Government).* Two demands for performance should therefore be met. This requirement implies various actions, such as (the order does not represent priorities):

a. Advanced informatization of the governance
b. Outsourcing of activities that can be better performed by private companies, or by Public-Private Partnerships

c. Promotion of governance oriented on enforcing or creation of virtuous automatic societal closed loops, as opposed to "governance by command" (autocratic governance)
d. Effective feedback from the societal operational subsystem (including via NGOs)

It follows that, in a certain sense, one aspect of eG is that of a large system engineering problem. One can also notice that the main danger of governance is intoxication with power, gradually distorting the societal feedback circuits. This process can be minimized by eG.

The previous definitions of eGvt and eG are both technology and content oriented.

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## KEY TERMS

**E-Democracy:** Democracy supported by friendly and secure information systems, in order to increase the participation of the citizens to local, regional, national or international decisions, by expressing answer to questions of general interest and/or selection of candidates for occupying public positions and/or expressing views on problems under discussion or proposing matters to be discussed.

**E-Service:** Service designed and delivered using ICT such as Web service and/or multi-channel.

**Governance:** In the present article, governance is understood in the sense of societal management.

**Information Society:** Society based on ICT, which is used in practical all fields, having the support of the ICT industry. In the Information Society, ICT has a major contribution to the GDP and also to employment. In the same time, information (and knowledge) is a key resource for achieving performance in societal and microeconomic management and also a public good.

**Informatization:** The process by which a computerized information systems is implemented in a socio-economic system, to support business and/or managerial activities.

**Management:** Aware and permanent process by which individual and collec-tive actions and resources are oriented on the achievement of a mission and performance in the development of a societal or microeconomic socio-econo-mic system, in the conditions of a variable and partially uncontrollable environment

# General Requirements for Digital Government



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## INTRODUCTION

"Digital government" (DG), "online government," "e-government (eGvt)," and "e-governance (eG)" are widely used terms. They suggest the use of modern information and communications technology (ICT) in the governance of socio-economic systems (SES). It is widely accepted that the goal consists in increasing the performance of the governance. This can be considered in the sense of improving the services provided to citizens and organizations and also of improving the socio-economic development. There are still various points of view concerning the scope and strategy. The purpose of the present article, based on existing results and trends, is to propose a set of general requirements for the informatized governance of socio-economic systems.

## SHORT HISTORICAL PERSPECTIVE

The use of digital computers to support the public administration by creating informatized registers, databases and integrated information systems, started in the 60s. They generated a number of advanced national, sectoral, and territorial information systems. The known example of Denmark's integrated state information systems, created by public institutions with the support of DataCentralen and Kommunedata in the late 80s and early 90s is remarkable (e.g., DataCentralen, 1990, Ekonomiministeriet, 1991, Ministry of Finance, 1992). In these years, the orientation was to support the core activities of the public administration, also easing the communication between citizens and organizations and the public administration.

The further development of ICT, starting with the two "explosions" in the 80s (PC and internet) made possible to formulate the need for "communications highways" and "government, which works better and costs less" (Gore, 1993). It was followed by the adoption of the Information Society as a strategy for development by the European Union (UE) The "Bangemann Report" (Bangemann, 1994) proposed "electronic tendering" and "trans-European administration network" as two of the ten priorities. The 1995 session of the G7 countries, launched a program which included also an "online government" project. DG was recognized as a key factor for achieving international competitiveness (e.g., Leitner, 2003) OECD and the World Bank initiated DG projects (e.g., Khalil, Lanvin, & Chaudhry, 2002; OECD, 2003). United Nation's World Summit on Information Society in 2003 paid a major attention to DG. EU allocated important R&D and structural funds for developing the Information Society, including also DG projects. Major IT companies showed their interest for the growing market of DG. (e.g., the IBM E-Government Centre in Berlin and the Oracle-HP E-Governance Excellence Centre in New Delhi).

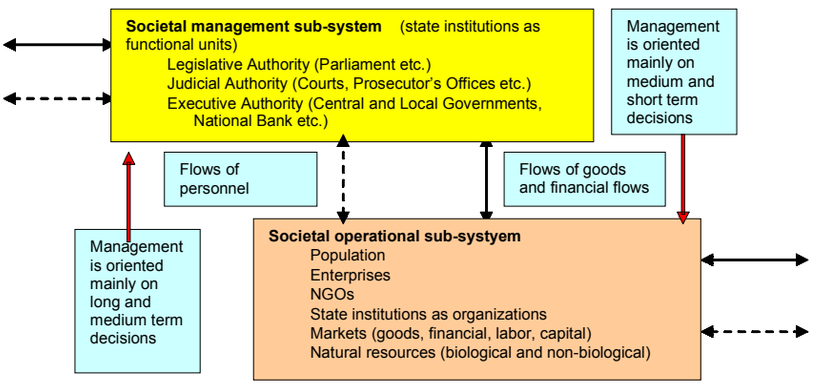
The main orientation for DG starting in the 90s, was on online services provided by the Public Administration to citizens and organizations, considered as customers. However, the scope of DG was gradually extended from the public administration, (executive authority) towards the set of three authorities (the executive, judicial, and legislative ones (e.g., Lenk, 2003; Lenk & Traunmueller, 2000; Reinermann & von Lucke, 2001) from national to international level. (e.g., EU's eEurope program was focused on national development aspects of the Information Society, whereas the following ones: eEurope 2005 and the Draft i 2010 (EC-1 and EC-2, 2005) have an accent on achieving the European informational interoperability.

The rising general interest for DG is also illustrated by the yearly International DG Conferences (such as EGOV in Europe and ICEG in Asia). UN produced an "e-Gvt Readiness Report" (UN, 2004). The EC established the "eGvt Observatory" as a contribution to the European Information Society. It complements the "European Information Technology Observatory (EITO)."

## ISSUES IN DG: GOVERNANCE

Issues can generate requirements. Issues in DG were proposed by a number of authors (e.g., Traunmueller & Wimmer, 2004). The authors enumerate a number of "challenges": portals for service provisions, usability, and empowerment, improving processes and back office integration, interoperability and standards, identity management and security, collaboration via multimedia, knowledge enhancement, and change management. The EU's e-Government Observatory retained following categories of issues: actors, e-services (for citizens, for businesses), history, legal framework, national infrastructure, strategy. E-services for citizens and for businesses are defined as components of a benchmark. The other issues contain

*Figure 1. Model of the Socio-economic system (SES)*




a wide range of visions, situations, and approaches. This suggests the need to consider basic problems such as governance. Just a few topics of governance are discussed here: (a) basic models; (b) sources of benefits and losses; (c) performance.

## Basic Models

A simple high-level model of a SES (see Figure 1) is proposed. Summarized, a SES has two subsystems: a societal management subsystem and a societal operational subsystem. The concept of SES can be defined at global, international, national, regional, or local level. In the followings, the national level is implicitly assumed, but this does not represent a limitation. As the information communication, processing, and storing are obviously vital for the societal management subsystem, DG is, in principle, the solution for increasing its performance. On the other hand, the performance of the enterprise depends on the performance of its own management and also of its socio-economic environment. SES's governance determines in a large measure, this environment. The governance generates e.g. regulations, information, public acquisitions, social services, collects taxes and information etc. It results that DG is of interest not only at macroeconomic level, but and also at microeconomic level.

A simple model of governance is proposed in Figure 2. This model suggests first basic requirements for Governance:

a. Separation of powers (precise delegation of decisions) between the three authorities: (1) generation of law to ensure the normal functioning and the development of the SES; (2) application of the law in the societal management and other general interest activities; in assuring the socio-economic development; (3) assurance of the respect of the law (homeostasis)
b. Assurance of the necessary coherent socio-economic information and of the feedback circuits necessary for the permanent improvement of governance, including via fair elections

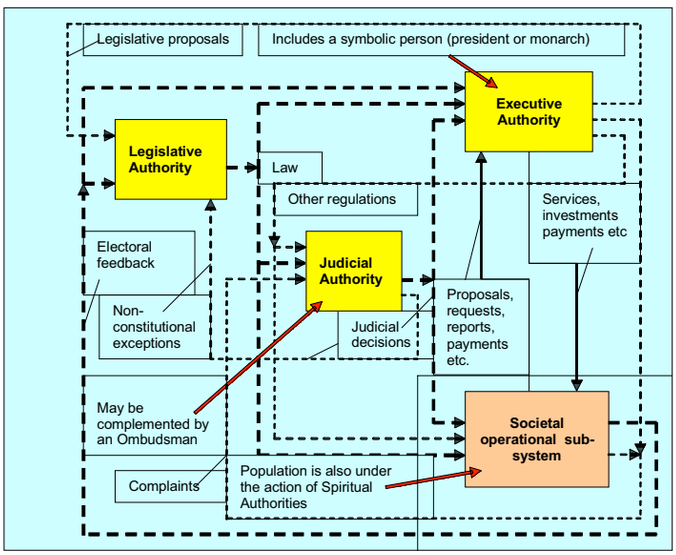
This model permits to define:

a. EGvt, as the informatized governance focused on the provision by the executive authority of e-services for the citizens and organizations within the SES
b. eG, as the informatized governance covering the domain on all the three authorities (executive, judicial and legislative)

These two definitions are content-based. It follows that DG and online government are generic terms defining the technology used in the societal governance.

The models in Figure 1 and Figure 2 suggest also the large number of actors involved in Governance. They are highly simplified models. The role of the executive authority to collect and distribute financial means is not apparent. Nor is its role to collect and validate data and information and to supply coherent results (which cannot be obtained at microeconomic level) to citizens, organizations and other SESs. Quasi-automatic closed loops, generating the natural trends of the evolution of the operational societal sub-system, are not represented, nor their possible switch from vicious to virtuous loops which, can be influenced by governance (e.g., Costake, Dragomirescu, & Zahan, 2001; Lockenchoff, 2001; Millard, 1995). This suggests another requirement for governance: to create or enforce virtuous loops and minimize vicious loops within the SES by adjustment and tuning actions and/or generation of new informational feedback circuits, instead of generating commands (emergency circumstances apart).

*Figure 2. A simplified model of governance*




## Sources of Benefits and Losses

DG is a component of the Information Society, the new society based on ICT. It follows the industry, the agriculture and the natural economy based societies. One can admit that every former major technological change increased the total value added per capita in the SES with approx. 1 ... 2 orders of magnitude. It seems reasonable to expect more or less similar results in the change from industrial to information society. This places eG, as one of the big challenges of our times. Some main losses and benefits associated to Governance are presented in Table 1 (see also Takano, 2004)

## Performance

The performance of DG is generally treated as: (a) definition of sets of indicators for eGvt; (see eEurope definition of e-services); (b) definition of sets of criteria (used in opinion surveys); (c) specific governance indicators. The set of eEurope e-G indicators characterize e-Gvt by a set of 20 e-services (12 for citizens, such as: income tax, job opportunities, personal documents, etc). and 8 for businesses, such as: VAT declarations, public acquisitions, etc.). Three or four service levels are possible: information, electronic forms, authentication, and validation of input information, full procedure, including payments (if applicable). This definition is precise, but its scope is limited. The set of criteria used e.g. in a survey (Economist Intelligence Unit, 2004) supports marking: (a) connectivity and technology infrastructure (max. 20%); (b) business and legal environment (max. 10%); (c) education and skill base (max. 10%); (d) government policy and vision (max. 15%); (e) e-Democracy (max. 15%); (f) e-Services and delivery channels to citizens (max 15%) and businesses (max 15%). It has a wide scope, but is qualitative: based on rankings resulting from processing opinions. A number of papers are oriented on performance indicators (e.g., Costake, 2004; Gant, 2003; OECD, 2002; UNCTAD, 2003). DG is not an objective *in se.* This results, for example, from the name of the i 2010 Draft Program: "A European Information Society for Growth and Employment." It means that the performance of eG is reflected in the performance of the SES. Hence, some governance performance indicators could be used, such as suggested in Table 2.

The definition and measurement of governance performance indicators can be therefore considered as an informational requirement for DG. Setting feasible target values (with the support of socio-economic models), opens the road to systemic eG.

## BUSINESS, INFORMATIONAL, TECHNICAL, AND MANAGERIAL REQUIREMENTS

Four sources for explicit or implicit requirements and conditions for DG can be found. They are: (a) theoretical

*Table 1. Possible losses and benefits associated to governance*

| **Examples of losses due to poor governance** | **Examples of benefits achievable by performant governance** |
|---|---|
| **Poor services to citizens and organizations:**<br>• Lack of informational coherence (such as: no shared nomenclatures and registers)<br>• Lack of necessary e-Services with high level of service<br>• Lack of informational integration<br>• Lack of adequate feedback<br><br>**Consequence:**<br>No one-stop service is possible | **Increase of the value added by the SES:**<br>• Better societal decisions (using decision support techniques and models, including for fiscal management)<br>• Better services delivered to the citizens and organizations (one-stop servicing based on integration of information, assurance of data security and back-office re-engineering)<br>• Clearing of closed loop bad debts (quasi-automatic informational closed loop)<br><br>**Consequence:**<br>The socio-economic development is supported |
| **Poor governance information system and management:**<br>• The Governance information system is a set of insular information systems, same data or information being repeatedly introduced and possibilities to correlate information are scarce<br>• Governance decisions are based not on quantitative models and analysis of causes, but mainly on opinions and "treatment of symptoms" | **Decrease of losses in the functioning of SES:**<br>• Better management of public resources (including better decisions on public acquisitions and investments)<br>• Better possibilities to identify fraud and better control of collection and use of public funds (by better laws and informational integration) |
| **Consequences:**<br>• Impossibility of coherent de-centralization of decision<br>• Opportunities for fraud | **Consequences:**<br>Supports the increase of the performance of the Governance |
| **They lead to disrespect of the law:**<br>• Underground economy, diminishing the financial means for Governance<br>• Corruption, paralyzing the application of the Law, for reasons of personal profits | **They lead to improved international image:**<br>• Cheaper foreign credits<br>• More attraction of foreign investments and tourists<br>• Better chances for competition on the global market |

*Table 2. Suggested possible governance key performance indicators*

| **Category** | **Examples of possible key performance indicators** (values to be comparable to a specified year) |
|---|---|
| **General** | **a. Social** such as: (i) Life expectancy at birth; (ii) holders of university degree/1000 inhabitants<br>**b. Economic** such as: (iii) GDP/ capita; (iv) annual inflation rate; (v) a consumer price index<br>**c. Socio-Economic** such as: (vi) Gini coefficient; (vii)% of population occupied in every of the three sectors |
| **Executive Authority** | **a. Economic:** such as (i) ICT investments / GDP; (ii) value of e-commerce/value of commerce; (iii) internet users/100 inhabitants; (iv) estimated value of the underground economy/GDP<br>**b. Socio-Economic** such as (iv) value of the corruption level estimated by Transparency International; (v) proportion of e-voting in total voting<br>**c. Technical:** such as (vi) sum for the 20 e-services (proportion of use per applicable service level); (vii) average value and variance of the response time to petitions (viii) proportion of e-commerce in the value of commerce |
| **Judicial Authority** | **a. Technical:** such as (i) average and variance of duration to solve a case (per categories of representative cases); (ii) variance of the punishment pronounced for similar facts, damage and circumstances (*idem*)<br>**b. Managerial:** such as (iii) number of end of year open cases (investigated or judged)/10000 inhabitants (*idem*) |
| **Legislative Authority** | **a. Technical:** such as (i) (Total no of active laws, government ordinances, and Decrees)/(annual working days); (ii) mean time before amending a law, a government ordinance, or a decree[per category of the field]; (iii) existence of procedures for simulating the likely socio-economic consequences of a draft normative act<br>**b. Managerial:** such as (iv) annual (number of government ordinances/number of laws) |

papers (e.g., Bakhus, 2000; Lenk &Traunmueller, 2000, 2002), and handbooks (e.g., Gupta, Kumar, & Bhattacharya, 2005); (b) points of view of the business community (such as Moriuchi, Cisneros, & Danish, 2001); (c) National information society or DG programs or plans; (d) International programs and reports (e.g., eGvt Observatory, 2004). A normal sequence could be considered: societal values and objectives => business requirements => informational requirements => technical and managerial requirements. Quality management in the sense of the ISO 9001:2000 recommendations can complement the resulting requirements.

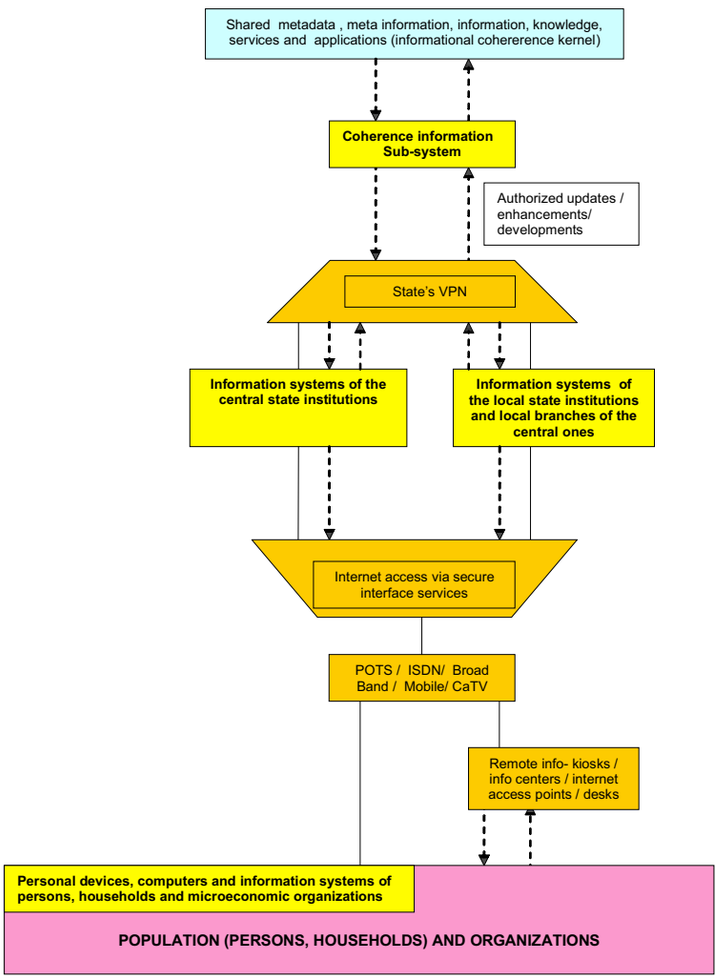
Societal values and objectives are specified in fundamental documents, such as UN's Declaration of Human Rights, E U's Treaty or general political ones (e.g., Soros, 1998). They formulate implicit requirements for Governance. They are just mentioned, their analysis being out of the scope of the present article. Administrative Reforms (e.g., Presidenza, 2000) or Judicial Reforms specify explicit requirements for DG. Business requirements for DG can be classified in following categories: (a) general; (b) oriented on citizens; (c) oriented on organizations, in particular businesses (d) oriented on users of the state institutions. They are exemplified in Table 3.

The DG business requirements enumerated in Table 3 above, have informational, technical and managerial consequences, as suggested in Tables 4 and 5. European Commission's projects for Interchange of Data between

*Table 3. Examples of business requirements for DG*

| Category | Typical requirements |
|---|---|
| **General** | a. Transparency and accountability of the Governance, including of the institutions of the three Authorities: Executive, Judicial, Legislative<br>b. Easy access to the public information on the state and evolution of the SES, at aggregated, sectoral and territorial levels, in tabular, graphical, cartographical formats supported by simple methodological explanations and mathematical models (e.g., input /output)<br>c. Easy Access to DG services<br>d. Minimization of time and effort to solve problems with the public institutions:<br>• one-stop servicing (optional self service);<br>• possibility of solving standard problems (such as notification, registration, certification or authorization of standard events or activities by every authorized state institution<br>• avoidance of repeated introduction of data (non requesting an existing validated and accepted data element in the state's information system;<br>• multi-channel options (full online to traditional face to face interface)<br>• help and online tutorial options by every authorized state institution;<br>• requested declaration forms displayed with actual known or previous<br>• data, if applicable<br>e. Multilingual content compatibility and recognition<br>f. Data security and data protection<br>g. Quality management control, including assurance of performance (steady improvement) and minimization of evasion, corruption and terrorism<br>h. Assurance of education and training for using ICT |
| **Citizens-oriented** | a. User-friendly access to public information and services, including one DG portal option.<br>b. International recognition of personal e-documents (identity, literacy, studies, property, etc.)<br>c. Wide range of e-service offered, including links to public sites via one general<br>d. portal<br>e. E-democracy (participation to the decisional process, without any external interference) |
| **Businesses-oriented** | a. Provision of complete online public e-services, including for company registration, tax payments, etc.<br>b. E-procurement for public acquisitions<br>c. Measures for promotion of the use of ICT (including e-business and public-private partnership in the development of DG) and development of the ICT industry<br>d. Provision of comparable, accurate and timely statistical information<br>e. Promotion of global e-business and e-commerce, including by collaboration with foreign governments for the global information society |
| **Oriented on users in state institutions** | a. Possibility to simulate and assess the effects of drafts decisions or regulations, before submitting to approval<br>b. Decision support services<br>c. Management of resources and administrative and functioning costs<br>d. Possibility to build coherent DG in the circumstances that various state institutions may use different hardware and software<br>e. E-procurement enhanced by post contractual follow-up |

*Figure 3. DG cooperative information system*




Administrations are particularly interesting for the data interchange architecture (IDA, 2003) and interoperability between applications and information systems (IDA, 2004). A framework for DG Information System was proposed—see Figure 3 (Costake & Jensen, 2002). The differences between e-Business and DG were analyzed (e.g., Riedl, 2003).

## PRE-REQUISITES FOR DG

The former requirements (Tables 3…5) imply a number of conditions (pre-requisites) for DG, such as:

a. **Political:** Implementation of DG implies a firm political will, in order to make the necessary managerial, financial, and legislative effort. It means commitment to develop the Information Society.

b. **Technical:** DG cannot be created unless: (a) a certain level of communications, capable to support a broad and sufficiently fast access to internet exists (b) the use of ICT by people, institutions and businesses is above a certain threshold. (e.g., sufficient computers used by people and organizations). In practice, this is no more a critical factor in the European area.

c. **Financial:** Budgetary funding is needed. International assistance and Public- Private-Partnership can help in a great measure. The high potential benefits suggest that governments may: participate to International Programs or apply for international loans, if a reasonable Program and a reasonably

*Table 4. Typical examples of informational and technical requirements induced by the business requirements (Table 3)*

| Category | Typical requirements |
|---|---|
| **Informational** | a. Standardization and assurance of international compatibility of the nomenclatures used in DG, e-business and e-banking<br>b. Unique identifications of basic elements of the SES such as natural persons, organizations, territorial-administrative units (such as regions and/or counties, localities), land parcels (including streets and roads) and constructions. Implies an informational subsystem linking registers and geographic database[s]<br>c. Stable methodologies, compatible with the technical and technological progress.<br>d. Sharing general interest data, information and knowledge (such as concepts, and procedures) and software tools<br>e. Integration, interconnection, and interoperability of the information systems of the public institutions, including automatic propagation of validated updates<br>f. Use of electronic documents and archiving<br>g. Use of multi-layered geographic databases<br>h. Use of data warehouses and data mining |
| **Technical** | a. Promotion of International DG Standards including Open Solutions, data security (including authentication and digital signature certification) data protection, interoperability within DG Information system<br>b. Cooperative architecture of the DG Information System (see example in Figure 3)—assuring compatibility with new technologies such as e-hub and grid computing<br>c. Development of standard applications systems such as e-business intelligence for DG, including specific eG applications, such as cluster analysis, optimization of taxation macroeconomic simulation etc<br>d. 24x7 availability<br>e. Specific DG infrastructure, at least:<br>• DG portal (possibly one for citizens and one for businesses)<br>• DG virtual private network (Intranet)<br>• citizen e- Identification card (or certified digital signature)<br>• e-Public Acquisition portal<br>• Knowledge management basic facilities (such as document management, content management, groupware tools, advanced interrogation capability) |

*Table 5. Examples of managerial requirements*

| Category | Typical requirements |
|---|---|
| **Organizational** | **Organizational entities** responsible for: |
| | a. **Strategy:** Office of the Prime Minister or Similar, or Ministry of Finance or Ministry of Interior or similar or Ministry for Informatics or similar or Interministerial Board<br>b. **Coordination:** Chief Information Officer or similar, Government ICT unit or similar or Ministerial body in charge for ICT<br>c. **Implementation:** Coordinating unit and / or specialized governmental unit, all ministries, agencies or other bodies<br>d. **Support:** Implementing unit[s], [specialized body], Court of Accounts or similar, Data Protection Agency or similar<br>e. **Governance business process reengineering tasks**, such as: separation of front-office, back-office and ICT administration activities, gradual integration of the back-offices |
| **Methodological** | a. Adoption of a DG Program Management methodology and Project Management methodologies for the component projects of the DG Program, including specific Program/Project organizational structures<br>b. Promotion of Public Private Partnership, where possible and perfomant |
| **Legislative** | **Main normative acts:**<br>a. Freedom of public information<br>b. Data protection/privacy<br>c. Information security management (including authentication and identity management)<br>d. E-documents)<br>e. E-commerce, e-business<br>f. Access to public sector information<br>g. Integration of public information<br>h. Advanced e-communications<br>i. E-services (such as public e-procurement) |

prepared set of Terms of Reference for component projects exist

d. **Managerial:** Complexity of DG implies a vision accepted by the society. DG implies also re-engineering of governance processes. Risk and Issue Management and Change Management as well as Program and Project Management Techniques are necessary supports. The rapid evolution of ICT implies an increased effort for training

## FUTURE RESEARCH OPPORTUNITIES

DG is still a new field, in evolution. Following future research opportunities are suggested:

a. Theoretical:
   1. The quantitative system theory of governance and DG. There is still a discrepancy between the complexity of the SESs and the management techniques and management decision supports used. Optimal governance is still a distant target
   2. Governance can be considered a form of management, namely societal management, complementing the usual "enterprise management." It follows that e-Governance could be "informatized societal management." The main result could be the definition of "roadmaps to eG" hence eG benchmarks based on facts and not by opinion

b. Pragmatic:
   1. The quality management (QM) of governance could contribute to clarifications for decision-makers and public opinion
   2. The specification of a widely accepted DG information system specification using e-hub and grid technologies and following the general concept illustrated in Figure 3
   3. The definition of the rational compromise between information system integration and privacy, in a world in which corruption and terrorism are true dangers

## CONCLUSION

Though still in development, the need for digital governance is already accepted at world level. It can be more than the provision of e-services by the public administration to citizens and organizations, or e-government (eGvt). It can be e-governance (eG), in the sense of informatized governance or informatized societal management. eG is an emerging interdisciplinary discipline which uses elements. of system theory, management science, computer science, information and knowledge science, informatics, economic science, political science, sociology, psychology. The necessary information and communications technology exists. In this sense, e-governance may become a key factor to ensure the socio-economic development in a global economy. It implies strategic planning including program and projects management approach. It should use a set of largely accepted societal key performance indicators and comprehensive models of societal management processes capable to orient the societal management processes re-engineering and support governance decisions in the sense of adjustment and tuning and not of commands.

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## KEY TERMS

**Advanced SES:** SES characterized by: sustainable socio-economic growth in the conditions of: (a) respect of the law (homeostasis); (b) respect of democracy (electoral feedback, other participation to societal decisions); (c) free-market competition (automatic improvement of the performance); (d) social cohesion (as specified in widely adopted Declarations of Human Rights and Obligations). In practice, an advanced SES implies the use of e-governance.

**Digital Government (DG) (equivalent term: Online Government):** Generic term, designating the technology on which governance relies. It can mean eGvt or eG.

**E-Governance (eG):** Informatized societal management. E-governance includes e-government and other e-Executive activities (including e-democracy), e-legislation, e-judiciary, and informatized societal decision support.

**E-government (eGvt):** Delivery of e-services to citizens and organizations by the Executive Authority of the SES. Every of these e-Services is defined by function and level of service.

**ICT Industry:** Information, communications and audio-visual technology industries, together with the production of information content.

**Interoperability:** Convergence of ICT platforms and networks making hardware and applications compatible and inter-communicable, usually using standards and solutions developed by ICT suppliers and /or NGOs financed by them

**Societal Closed Loop:** Closed circuit generating automatically by the business processed of the SES or designed and implemented by managerial decision (artifact). One example of an automatic closed loop is the mechanism of price formation in free markets of goods. One example of an artifact closed loop is the circuit in which the Ministry of Finance determines the level[s] of taxation according to the results of the tax collection.

**Socio-Economic System (SES):** A system defined by a closed domain, in which: (a) people (individuals, households or other groups), natural resources (biological and non-biological)and organizational entities are linked by flows of personnel, material substance, energy, financial means and information: (i) between themselves (as applicable); (ii) with people, natural resources and organizational entities of other SESs (as applicable); (b) the actions of the people and of the organizational entities tend to increase their material and immaterial wealth according to (i) shared culture[s] and (ii) within the limits of defined and publicized laws and similar regulations and rules; (c) the system is structured in such a way that two interdependent subsystems can be recognized: (i) the operational subsystem, in which the activities of people and organizations is oriented on specific productive and similar activities and (ii) the societal management subsystem, in which the activities of people and organizations are oriented on assuring the normal functioning of the SES by generating the necessary regulatory and control actions of general interest.

# Global Benchmarking of E-Governments



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## INTRODUCTION

Metaphorically, the term benchmarking traces back to land surveying, where a *benchmark* is referred to as "a mark on a permanent object indicating elevation and serving as a reference in topographic surveys and tidal observations" (Merriam-Webster Online Dictionary, n.d.). Its linguistic roots originate from "the chiseled horizontal marks that surveyors made, into which an angle-iron could be placed to bracket (*bench*) a leveling rod, thus ensuring that the leveling rod can be repositioned in the same place in future"(Wikipedia, n.d.). In the most general term, a benchmark is a point of reference from which measurements may be made. Applied in a business context, benchmarks therefore serve as "measurements to gauge the performance of a function, operation or business relative to others" (Bogan & English, 1994, p. 4).

Based on that understanding, the essential business concept of benchmarking can be defined as the continuous and systematic process of improving strategies, functions, operations, products, or services by measuring, comparing and analyzing relevant benchmarks in order to produce superior business performance (Böhnert, 1999; Schmitz, 1998). Thus, in contrast to the static nature of benchmarks representing reference points, according to its original meaning (ensuring the exact repositioning of leveling rods at any time) the activity of benchmarking involves deploying the former as terms of reference to make progress.

In the pursuit of superior performance, benchmarking embraces the elements of comparison and change (Spendolini, 1992) based on information and knowledge derived from the very process of measuring and comparing benchmarks. First, public and private companies discover how their functions, operations, products, or services perform in comparison to those of benchmark partners. Second, having identified best practices "there is a call to action that may involve a variety of activities, from the making of recommendations to the actual implementation of change based (at least partially) on the benchmarking findings" (Spendolini, 1992, p. 15).

Taking into consideration the dynamic thrust of benchmarking activities outlined above, global benchmarking of e-governments is thus widely regarded as an essential stimulus for further e-government development, as it may facilitate the evaluation of national efforts compared to international best practice on the one hand and promote successful implementation of e-government applications serving the needs of citizens and businesses on the other from a conceptual point of view (Kunstelj & Vintar, 2004).

In order to identify the contribution of international benchmarking studies to successful design and implementation of e-government initiatives and models, this article will present the study designs and major outcomes of three benchmarking reports on e-government development. Based on these findings the authors will critically review these three study series, by raising the question whether the approaches pursued to benchmark e-government development show the aptitude to cope with the complexity of the socio-technical system e-government and thus support its comprehensive evaluation.

## BACKGROUND

According to the United Nations (2003a), "governments are increasingly becoming aware of the importance of e-government to improve the delivery of public services to the people" (p. 128). The roots for this recognition lie in two recent and interrelated phenomena: First, the rapid pace of globalization has caused an incorporation of intra-country trade and investment into transnational networks with economies striving to offer more competitive products and services. Second, advances in information and communication technology (ICT) have triggered new progress in the integration of these networks and in the improvement of the efficiency of businesses and services (United Nations (UN), 2003a). In order to satisfy the demands of citizens in the context of a changing environment, there seems to be no chance for governments around the globe to ignore "the imperative of e-government."

In this context, it is generally felt that the evaluation and measurement of e-government initiatives represents "an important or even essential element in the development and introduction of e-government" (Kunstelj & Vintar, 2004, p. 1). Consequently, e-government benchmarking studies and reports are first and foremost characterized by their multitude—according to Bannister (2004) benchmarking of e-government has even "become a small industry" (p. 1)—as well as by different approaches to evaluate e-government development. Overall, Kunstlj and Vintar (2004) identified more than 40 national and international reports monitoring, evaluating, and benchmarking e-government development.

Global e-government surveys are mainly conducted by international consulting and market research organizations (Kunstelj & Vintar; 2004). In the year 2004, Accenture issued its fifth annual report on E-Government Leadership, in 2001 the World Market Research Centre conducted the first Global E-Government Survey (since 2002 published annually by the Taubmann Center for Public Policy, Brown University, Providence, RI), and in the same year Taylor Nelson Sofres started publishing its annual global study named Government Online: an International Perspective (Dexter & Parr, 2003; Rohleder & Jupp, 2004; West, 2004). Further examples of international e-government studies include the Balanced E-Government report compiled by the Bertelsmann Foundation and Booz Allen Hamilton as well as the Global Information Technology Report published since 2001 by the World Economic Forum (Schmidt et al., 2002; Schwab, 2005).

Moreover, global benchmarking reports are conducted or commissioned by international or supranational organizations. Since 2001 the United Nations Department of Economic and Social Affaires has compiled the UN Global E-Government Survey on a (bi-)annual basis and Capgemini annually surveys the "online availability of public services" of European Union member states (also including Norway, Iceland and Switzerland) on demand of the European Commission (CGE&Y, 2003; UN, 2001; UN, 2003a). The latter institution is also involved in benchmarking e-government services by assigning the "eEurope Awards" for e-government on a bi-annual basis since 2003 (Leitner, 2003; Leitner, Alabau, Soto Mora, Kreuzeder, Hallencreutz, Millard, et al., 2005).

In the following, the outcomes and study designs of the e-government benchmarking reports published by Accenture, West, and the United Nations in the year 2004 (in case of the United Nations' report: 2003) will be discussed in detail. This selection is based on several considerations: First, all three studies feature a ranking of the countries surveyed indicating the status of e-government development measured by comprehensive indexes. Second, all e-government reports represent study series published at least on a bi-annual basis and thus reflect a dynamic component. Third, as the main thrust of this article is to critically review *global* benchmarking of e-governments, the three studies presented in detail cover countries from all five continents worldwide. Fourth, the three studies series represent different types of editorships ranging from scientific institutions (West) to international organizations (United Nations) to global consulting organizations (Accenture) and may thus reflect different motivations for conducting e-government benchmarking research.

## BENCHMARKING E-GOVERNMENT

### Study Designs and Research Methodologies

In publishing the report E-Government at the Crossroads the United Nations (2003a) aim to contribute "to the development efforts of countries by providing a benchmark to gauge the comparative state of e-government readiness and e-participation for development in a rapidly globalizing world" (p. 133). Hence, the survey adopts a people-centric approach, focusing solely on government-to-consumer/citizen (G2C) and consumer/citizen-to-government (C2G) relationships. Within this study design, government-to-government (G2G) services are implicitly assessed, since advances in G2C and C2G relationships are closely linked to G2G improvements. Government-to-business (G2B) services, however, go beyond the scope of the survey and are therefore not measured (UN, 2003a).

The UN report presents a competitive ranking encompassing the status of national e-governments of all 191 member states according to two primary indicators: the state of e-government readiness and the extent of e-participation. Whereas the first indicator assesses the capacity of the public sector to use ICT for encapsulating in public services and deploying high quality information and effective communication tools to the public, the latter measures the willingness of governments to use ICT to provide high quality information and effective communication tools in order to empower people to able participation in consultations and decision-making. Methodologically, the e-government readiness index thus "assesses the quantity of information and services provided," while the e-participation index "assesses the same from a qualitative perspective, with special focus on consultation and decision-making" (UN, 2003a, p. 136).

The e-government readiness index represents a composite index comprising the Web measure index, the telecommunication infrastructure index and the human capital index, with one third of the weight given to each component. Based upon a five-stage quantitative Web

presence measurement model, the Web measure index assesses the generic aptitude of central governments to employ e-government as a tool to inform, interact, transact and network. Depending on the level of maturity and sophistication, national e-government presence online is then classified as emerging, enhanced, interactive, transactional or networked presence. According to the quantitative nature of the Web measure index, this assessment is based on a questionnaire which requires researchers to assign a binary value to the indicator, based on the presence or absence of 288 specific electronic services and facilities available. In the case of countries with decentralized structures and regional or local governments in dispensation of one or more of the relevant public services, numerical scores are adjusted accordingly, so as not to penalize them. The telecommunication infrastructure index is derived from a composite weighted average of six basic infrastructural indicators: PCs/1,000 persons, internet users/1,000 persons, telephone lines/1,000 persons, online population/1,000 persons, mobile phones/1,000 persons, and televisions/1,000 persons. The human capital index represents a composite of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio, with two thirds of the weight given to the first indicator and one third to the latter (UN, 2003a).

The e-participation index is based on an assessment of 21 citizen informative and participatory services and facilities in e-information, e-consultation, and e-decision-making. Each country is then measured on scale of 0-4 (0=never, 1=sometimes, 2=frequently, 3=mostly, and 4=always); the value of the index is derived by standardizing the scores. As the e-participation index serves as a qualitative measure employing proxy indicators for the quality, relevancy and usefulness of electronic services as well as the willingness of governments to provide relevant information and to offer participatory decision making in public policy matters, the report explicitly acknowledges that "any measurement of a 'utility' indicator will impart a bias in scores based on the researchers perspective" and that "the resulting scores should be interpreted with caution" (UN, 2003a, p. 141).

Accenture's 2004 e-government benchmarking report, titled E-Government Leadership: High Performance, Maximum Value, aims to support governments in identifying "the course of action that will most likely deliver high performance in e-government" (Rohleder & Jupp, 2004, p. 2). In contrast to the UN survey, which fits e-government into the conceptual framework of the vision of human development provided by the UN Millennium Declaration, Accenture's e-government leadership report focuses on national strategies and efforts that should propel countries toward whole-of-government service transformation, which is regarded as the ultimate goal of e-government (Rohleder & Jupp, 2004; UN, 2000).

The e-government leadership report measures the overall maturity scores of 22 national e-governments (Australia, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Malaysia, Mexico, the Netherlands, Norway, Portugal, Singapore, South Africa, Spain, Sweden, the United Kingdom, and the United States) on the basis of a quantitative assessment of the quality and maturity of 206 selected services for both citizens (G2C) and businesses (G2B). No explanation is given on the selection of countries being surveyed (Eifert & Püschel, 2002).

The overall maturity score represents a composite index comprising the indicators service maturity and customer relationship management (CRM) with 70% weighting allocated to the first component and 30% to the latter. Service maturity serves as a measure for the level to which a government has established an online presence and is derived by the product of service maturity breadth (i.e., the number of services in the sphere of responsibility of national governments that are available online) and service maturity depth (i.e., the level of completeness with which each service is offered). In order to determine the degree of service maturity, researchers behaving as citizens and businesses first categorize services by means of a three-stage framework encompassing the levels publish (passive/passive relationship), interact (active/passive relationship) and transact (active/active relationship). Then, within each stage, services are scored at three levels depending on their maturity. In cases where services are delivered at regional or local level, these services are factored out of the analysis so that the governments concerned are in no way penalized. The extent to which governments manage interactions with citizens and businesses and deliver services in an integrated way is measured by the indicator customer relationship management, which is evaluated across five building blocks: insight, customer service, interactions, organization and networks, and a separate support measure (Kunstelj & Vintar, 2004; Rohleder & Jupp, 2004).

In addition to identifying the overall maturity scores of 22 e-governments, Accenture's 2004 benchmarking report includes a quantitative survey of citizens' perceptions and practices related to e-government in 12 countries (Australia, Belgium, Canada, France, Germany, Ireland, Italy, Singapore, Spain, Sweden, the United Kingdom, and the United States). For this purpose, 400 internet users were interviewed by telephone in each country (with the exception of the United States, where 600 were surveyed) and asked to answer a set of 11 questions about their attitudes toward their country's e-government programs, their individual use of e-government and their interests in particular online services. As this survey of the citizens' view on e-government only includes internet users, its

results do not represent the perceptions of the entire national populations (Rohleder & Jupp, 2004).

Furthermore, the e-government leadership report is supplemented by qualitative background research in order to obtain information referring to the history, content and ownership of each country's e-government program, recent legal and political developments around e-government and details on the implementation process (Rohleder & Jupp, 2004).

Introducing his 2004 global e-government report, West (2004) explicitly refers to the transformative nature of electronic government by noting that "recent advances in networking, video imaging, and graphic interfacing have allowed governments to develop Web sites that contain a variety of online material" and that "electronic government is supplanting traditional means of access based on personal visits, phone calls and mail delivery" (p. 3).

In contrast to the benchmarking studies of the United Nations and Accenture, which both aim to support governments in the pursuit of certain goals, the main focus of West's report is to provide an overview of the quantity of information and online services available on national government Web sites worldwide. Based on these findings, however, the concluding remarks of the 2004 study also contain recommendations on how user-friendliness and accessibility of e-government Web sites could be enhanced (West, 2004). Hence, West's global e-government report is characterized by a people centric approach focusing on the relationships between government and consumers/citizens (G2C). Overall, 1,935 national government Websites of 198 different nations worldwide are analyzed with the intention of providing "a full sense of what is available in particular nations" (West, 2004, p. 3).

In order to determine the e-government rankings of the 198 nations surveyed, Web sites are first evaluated for the presence of various features dealing with information availability and public access and for the number of online services offered. In the 2004 report four percentage points are awarded to each Web site for the presence of one of the following 18 features summing up to a maximum of 72 points: publications, databases, audio clips, video clips, foreign language access, not having ads, not having premium fees, not having user fees, disability access, having privacy policies, security policies, allowing digital signatures on transactions, an option to pay via credit cards, email contact information, areas to post comments, option for e-mail updates, option for Web site personalization, and PDA accessibility. Up to 28 bonus points are assigned for the number services fully executable online on each Web site (with one point allocated for each service up to a maximum of 28 points for 28 or more online services). Services offered on Web sites are only counted as online-services if the entire transaction can occur online. The e-government index is then calculated by averaging the totals of each Web site observed within a given country, producing ratings ranging from 0 to 100 percentage points (West, 2004).

Summing up the research methodologies of the studies outlined above, it seems worth noting that as far as the quantitative indexes are concerned, both the UN report and Accenture's E-Government Leadership Survey use multi-stage frameworks in order to determine the sophistication of e-government (Lindlbauer & Skerlan-Schuhböck, 2004). Even though the United Nations' Web presence measurement model serves as a means to categorize the maturity of a government's online presence as a whole, whilst Accenture's classification of service maturity is geared towards individual services, the stages of both frameworks are based on different levels of communication, ranging from one-way basic information provision to two-way transaction based on integrated networks (Lucke & Reinermann, 2000). Contrary to these two study designs based on evaluation frameworks, West's global e-government report solely assesses—in addition to the presence or absence of 18 features—the number of online-services offered by national government Web sites and therefore only provides an indirect measure for the development of e-transactions.

Regarding the aspects covered by the three study series outlined above, the UN e-government readiness index reflects the most comprehensive approach to measure e-government development, as it supplements a country's Web presence measurement by taking into consideration its telecommunication infrastructure as well as its human capital. Even though Accenture's overall maturity score represents a composite index of the two measurements service maturity and customer relationship management, it remains confined to regarding e-government development from the front-office supply perspective. West's e-government index pursues a similar approach to assessing e-government development by evaluating the front-office supply of governmental Web sites for the presence of certain features and for the number of online-services provided by these Web sites (Janssen, Rotthier, & Snijkers, 2004; Kunstelj & Vintar, 2004; Rohleder & Jupp, 2004; UN, 2003a; West, 2004).

## Major Findings

Table 1 illustrates the e-government readiness rankings, the e-participation rankings, the overall maturity rankings and the e-government index rankings for the top 15 countries of each measurement. According to the UN global e-government survey, the majority of English-speaking countries (the United States, Australia, the United Kingdom, and Canada) and the Scandinavian nations realize the most advanced state of e-government readiness. In spite of the globally non-representative coverage of

*Table 1. E-government readiness rankings, e-participation rankings, overall maturity rankings, and e-government index rankings for the top 15 countries*

| *Country* | *E-government readiness*[a] | *Country* | *E-participation*[b] | *Country* | *Overall maturity*[c] | *Country* | *E-government index*[d] |
|---|---|---|---|---|---|---|---|
| United States | 0.93 | United Kingdom | 1.00 | Canada | 0.80 | Taiwan | 0.44 |
| Sweden | 0.84 | United States | 0.97 | Singapore | 0.67 | Singapore | 0.44 |
| Australia | 0.83 | Canada | 0.83 | United States | 0.67 | United States | 0.42 |
| Denmark | 0.82 | Chile | 0.83 | Australia | 0.58 | Canada | 0.40 |
| United Kingdom | 0.81 | Estonia | 0.76 | Denmark | 0.58 | Monaco | 0.39 |
| Canada | 0.81 | New Zealand | 0.69 | Finland | 0.58 | China | 0.37 |
| Norway | 0.78 | Philippines | 0.67 | Sweden | 0.58 | Australia | 0.37 |
| Switzerland | 0.76 | France | 0.64 | France | 0.57 | Togo | 0.36 |
| Germany | 0.76 | Netherlands | 0.64 | Netherlands | 0.55 | Germany | 0.35 |
| Finland | 0.76 | Australia | 0.62 | United Kingdom | 0.55 | Iraq | 0.34 |
| Netherlands | 0.75 | Mexico | 0.60 | Belgium | 0.51 | Hong Kong | 0.34 |
| Singapore | 0.75 | Argentina | 0.59 | Ireland | 0.51 | New Zealand | 0.34 |
| Rep. of Korea | 0.74 | Ireland | 0.59 | Japan | 0.51 | Italy | 0.33 |
| New Zealand | 0.72 | Sweden | 0.59 | Germany | 0.50 | United Kingdom | 0.33 |
| Iceland | 0.70 | Germany | 0.53 | Norway | 0.49 | Liechtenstein | 0.33 |

[a]E-government readiness index (UN, 2003a). [b]E-participation index (UN, 2003a). [c]Overall maturity score (Rohleder & Jupp, 2004). [d]E-government index (West, 2004).

Accenture's survey encompassing only 22 nations, these findings are supported by the 2004 ranking of overall e-government maturity, with the same English-speaking countries as well as Denmark, Finland, and Sweden scoring among the top 10 nations. The UN e-participation ranking and West's e-government index ranking, however, show a geographically more scattered picture, with three developing countries (Chile, Estonia, and the Philippines) reaching a better position than most developed nations in the former and Taiwan, China, Togo, and Iraq scoring among the top 10 nations in the latter.

The matrix presented in Table 2, which summarizes Spearman's rank correlation coefficient for the quantitative rankings of countries covered by each pair of studies, supports the findings outlined above that the UN e-government readiness ranking and Accenture's overall maturity ranking show a high similarity in spite of their differing geographical coverage. The high correlation coefficient of 0.798 can be traced back to similar study designs, which both assess e-government development based on multi-step frameworks. Moreover, West's e-government index ranking is also highly correlated to Accenture's overall maturity rankings (correlation coefficient 0.731): Even though the former index does not deploy a multi-step framework, both indexes tend to assess similar aspects of user-friendliness and accessibility by rewarding Web sites for the presence of certain features in the case of West and by appraising the CRM measure in the case of Accenture. Finally, the UN e-government readiness ranking and West's e-government ranking show an average correlation of 0.531 caused by the rather narrow methodological overlapping of both studies: In contrast to the UN's five-step Web presence measurement model, West indirectly measures the development of e-transactions by assessing the number of online-services offered on governmental services; however, certain features assessed by West's e-government index represent characteristics of development stages of the UN Web presence measurement as well.

The major findings of the UN global e-government survey show that despite the end of the dot-com boom and international security concerns, e-government is still

*Table 2. Correlation between e-government rankings based on quantitative indexes (Spearman's rank correlation coefficient)*

| | *E-government readiness*[a] | *Overall maturity*[c] | *E-government index*[d] |
|---|---|---|---|
| *E-government readiness*[a] | 1 | 0.798 | 0.531 |
| *Overall maturity*[b] | 0.798 | 1 | 0.731 |
| *E-government index*[c] | 0.531 | 0.731 | 1 |
| | | | |
| [a]E-government readiness index (UN, 2003a). [b]Overall maturity score (Rohleder & Jupp, 2004). [c]E-government index (West, 2004). | | | |

*Note: The Spearman's rank correlation coefficient was calculated on the basis of countries covered by each pair of study series. The rankings were determined based on the quantitative values of the relevant indexes.*

expanding; by 2003, 173 out of 191 member states used internet services in some capacity or another (UN, 2003b). While e-government Web sites are still "mushrooming around the globe in a haphazard manner," there "appears to be a gradual, but steady, trend toward national portal/ gateway sites, specialty portals and one-stop service sites" (UN, 2003a, p. 142). Besides formal e-government policies such portal sites seem to be a key success factor, as 24 of the top 25 countries have either or both, a clear e-government statement and a specific e-government portal. Finally, the survey finds substantial evidence "that the imperative for effective e-government remains a multi-pronged approach to its development, based on ICT and human and telecommunications infrastructure development. If effectively utilized, e-government can push the frontiers of development around the globe" (UN, 2003a, p. 143).

Accenture's 2004 e-government leadership report presents five key findings. First, while still expanding in absolute terms, e-government advances are diminishing; second, leaders in e-government are harvesting tangible savings; third, promoting take up of e-government is taking hold as a priority, but the challenge still remains; fourth, the integration challenge is expanding vertically across regional and local levels of government; and finally, personalization of e-government Web sites is emerging. Overall, the e-government leadership report concludes that "there are significant savings to be reaped from e-government, and most governments are just beginning to realize this. Governments should concentrate on promoting take-up and communicating the benefits to all, in order to attain these significant savings. It is now time for governments to focus on driving high performance through their online programs, so that they can get better outcomes in a more cost-effective manner" (Rohleder & Jupp, 2004, p. 58).

Having assessed the e-government development of 198 nations based on the "e-government index," West (2004) concludes that "progress is being made, albeit at an incremental pace" (p. 3). Factors hindering e-government reaching its full potential in terms of accessibility and effectiveness encompass—according to his findings—budget, bureaucratic, and institutional forces, which limit the possibility of the public sector to integrate technology into its mission. In order to increase citizen usage and reduce the costs of e-government, the global e-government report 2004 suggests that accessibility and user-friendliness of Web sites should be enhanced by regular updates, A-to-Z indexes and multi-lingual content (West, 2004).

## Critical Remarks

Having presented the study designs of three major e-government benchmarking reports as well as having glanced at their major outcomes, it appears worthwhile to address the question, whether the three reports feature a comprehensive measurement of e-government development from a methodological point of view and thus represent an appropriate foundation for governments and decision-makers striving for the sustainable design and implementation of e-government systems in terms of their functionalities.

First of all, it has to be noted that benchmarking studies—as well as (scientific) research in general—can only be conducted within an explicitly or implicitly defined and consequently limited area under investigation. Hence, the validity of findings and outcomes derived from benchmarking activities also remains confined to the area observed. Regarded from a methodological perspective it is, therefore, impossible for benchmarking studies to measure *all* aspects of the socio-technical system e-government (Schülein & Reitze, 2002; Seiffert, 2003).

In order to scrutinize the functionalities of the benchmarking studies previously presented, it thus ap-

pears worthwhile to broaden the concept of benchmarking by discussing its goals from a theoretical perspective. Applied in a social context, goals represent aspired situations, from which criteria for the scaling and measurement of behavior patterns and of consequences of the latter can be derived (Kappler, 1975). The measurement of behavior patterns, again, represents a key element of benchmarking activities, as observable measurement indicators (i.e., benchmarks) must be derived in order to compare the performance of the surveyed entity and to elaborate directives for new actions to be taken. However, the operationalization of goals can only be conducted in a functional way if indicators for measurement can be identified, which can be influenced by the individual or the organization (Bönnert, 1999).

This, again, raises the question whether the two benchmarking reports outlined above feature an appropriate process of operationalization in the sense that the surveys indicate what they claim to indicate (Kappler, 1995). Regarding e-government as the "government use of modern information and communication technologies as applied to the full range of functions from policy making, policy implementation (…) to assessing and evaluating their results" (Kunstelj & Vintar, 2004, p. 132), the focus of all three studies appears to be narrow, as central aspects such as back-office reorganization and impacts of e-government are not included. Applying the scheme classifying the scope of e-government surveys suggested by Kunstelj and Vintar (2004), the UN report's main approach to monitoring e-government development encompasses e-readiness of citizens as well as front-office supply (i.e., the government's point of view), whereas Accenture's and West's approaches only cover the latter aspect.

This narrow scope of the three e-government benchmarking reports scrutinized, now limits their functionality in terms of decision-support for governments and policy makers striving for the development and implementation of sustainable and comprehensive e-government models. A number of potential shortcomings have been put forward against the narrow and methodologically limited approach predominant in most e-government measurements (Janssen et al., 2004; Kustlj & Vintar, 2004) by academic research challenging the overall benefit of these benchmarking studies.

1. Measures and indicators applied are generally criticized for being too simplistic and superficial–mostly scoring what can easily be measured and hence not meeting the complexity of (transformative) e-government. However, most authors also acknowledge the fact that the development of more comprehensive indexes, as well as the gathering of adequate information, represent a major scientific challenge (Bannister, 2004; Janssen et al., 2004; Peters, Janssen, & van Engers, 2004; Moon, Welch, & Wong, 2005).
2. Existing measurement instruments are criticized for lacking a framework incorporating the relationships between the indicators assessed and the use of resources (Peters et al., 2004). On the whole, a number of researchers (Drüke, 2005; Moon et al., 2005; Peters et al., 2004; Taylor & Lips, 2004) find fault with the nonexistence of a well founded theory on e-government (measurement); Taylor and Lips (2004) judge the predominant *way of seeing* e-government as being "techno-centric, positivist and comparative" (Taylor & Lips, 2004, p. 11).
3. Supply-oriented indicators appear primarily to suit the objectives of providers of e-government services, however, other stakeholders may tend to prioritize other measures not covered by most studies and would thus come to different interpretations of the status of e-government. "As such, the existing instruments provide a picture of the status of e-government that may not be useful as surrogates for deducing the e-government performance" (Peters et al., 2004, p. 487).
4. Corresponding to the narrowly defined indexes, countries may be inclined to "launch e-services along the *quick-fix, quick-wins* principle and rapidly contruct the electronic equivalent of a traditional, bureaucratic administration" (Kunstelj & Vintar, 2004, p. 133). Also, the headline attention benchmarks attract is thought to cause problems in the event of not well designed measures: If this is the case, benchmarking studies may "end up doing more harm than good as politicians and administrators maneuver to optimize benchmarks scores rather than e-government performance" (Bannister; 2004, p. 13).

As several studies on the measurement of e-government development suggest (see e.g., Aichholzer & Winkler, 2003; Bannister, 2004; Janssen et al., 2004; Kunstelj & Vintar, 2004; Ostermann & Staudinger, 2005; Peters, Janssen, & van Engers, 2004), the design and implementation of sustainable e-government initiatives has to be based on a comprehensive approach, taking into consideration not only front-office supply of online services but also ICT-readiness, back-office service fulfillment and transformation capability, service usage and demand and e-government impact. According to findings of the United Nations (2003a) the full potential of e-government can only be realized if ICT-infrastructure and the overall level of ICT-knowledge enable the vast majority of a country's population to benefit from online information and services. As far as back-office reorganization is concerned, Millard, Iversen, Kubicek, Westholm, and Cimander

(Millard et al., 2004) could demonstrate "that there is a clear and strong link between reorganizing government back-offices and the electronic public services experienced by users" (p. 5). Finally, several research reports (Kunstelj & Vintar, 2004; Lucke & Reinermann, 2000; Peters et al., 2004) stress the fact that the effects as well as the impact of e-government initiatives have to be integrated into a comprehensive evaluation model, as traditional means of administrating the public sector can only be supplanted by digital government if additional value can be created for citizens, businesses, politicians, and public authorities.

In a paper recently published on the evaluation of e-government development, Kunstelj and Vintar (2004) sketch a draft model of a holistic approach to monitoring e-government progress encompassing the areas environment maturity (i.e., e-readiness), back-office, front-office, and allowing for measures based on different stakeholders' perspectives. A general overview of the structural components of this model is illustrated in Exhibit 1.

Such a holistic approach to benchmarking e-government development—as exemplified in Exhibit 1—broadens the area under investigation and shows the potential to enhance the validity of the information gained from benchmarking activities in a differential way, thus raising the functionalities of the latter. Benchmarking reports based on such a comprehensive evaluation framework would now represent an appropriate foundation for governments striving for the implementation of sustainable e-government models, as the focus of development efforts is likely to shift from the supply-oriented provisioning of online-services to benefiting from the transformative potential of e-government by the establishment of integrated electronic services (Kunstelj & Vintar, 2004; Sakowicz, 2003).

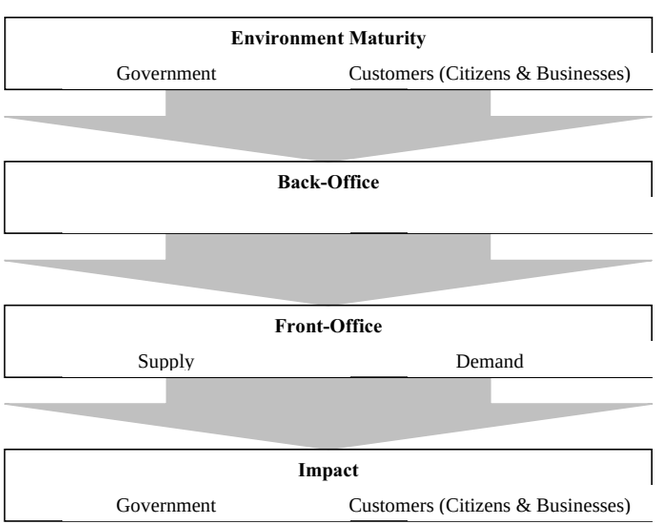
The functionalities of the three study series previously outlined, however, remain limited to certain areas and perspectives and therefore do not come up to the conceptual broadness of a comprehensive definition of e-government. On the other hand, based on the three benchmarks scrutinized plausible conclusions can be drawn for certain areas of e-government (mainly front-office supply of online services). Consequently, these reports can also turn out to be purposeful for policy-makers in the pursuit of e-government progress, if the latter (1) do not misinterpret the benchmarking findings as being representative for the sophistication of overall national e-government and (2) embed these findings into a comprehensive evaluation framework as suggested in Exhibit 1 (Ostermann & Staudinger, 2005).

## FUTURE TRENDS

In line with the shortcomings of current e-government benchmarking studies which have been previously discussed, a number of alternative models to monitoring e-government development are suggested by researchers and transnational institutions, mostly striving for a more theoretically-founded and comprehensive approach to measuring its progress and sophistication.

The draft model of a holistic approach to monitoring the development of e-government composed by Kunstelj and Vintar (2004) has already been outlined in the section

*Exhibit 1. Structural components of a holistic approach to evaluate e-government development (according to Kunstlj & Vintar, 2004, p. 144)*



above; according to this framework future e-government evaluation should include environment maturity, back-office, front-office and e-government impact with all measures—except back-office—assessed from customers' as well as governmental perspectives. In order to assess the information on e-government performance offered by benchmarking studies, Janssen et al. (2004) identify five categories of indicators for measuring e-government development (input indicators, output indicators, usage/intensity indicators, impact/effect indicators, and environment/readiness indicators) and advise governments to evaluate the results of theses studies based on this comprehensive portfolio of different measures. Drüke (2005) also follows a comprehensive understanding of e-government when suggesting an evaluation model for success in local government: Based on ten key factors for the successful design of virtual town halls (guiding principles and strategies; organization, project and change management; applications; benefits and costs; the right technology and organization of the use of technology; competence, motivation and qualifications; creation of acceptance, marketing; co-operations and partnerships; sustainable resources; and legality) put forward by Grabow, Drüke and Siegfried (2002) local e-governments are measured by the extent to which these success factors—divided again into prioritized sub-factors—are met.

Kubicek, Millard, and Westholm (2003) propose an institutionally-focused approach to analyzing electronic public services, distinguishing between single and multiple services on the one hand and one or multiple stages of administration involved for the delivery of a specific service on the other, and recommend the establishment of a good practice exchange framework and mechanism for e-government (Kubicek et al., 2003; Millard et al., 2004). Based on further research, Westholm suggests a model to improve e-governance embedded in the historically grown governance triangles comprising the actors economy, state and civil society (Westholm, 2005). This model goes in line with the PRISMA (Providing Innovative Service Models and Assessment) project of the European Union, which takes into account long-term perspectives of e-government and changing environments and hence strives for the identification of future requirements of e-government development based on different scenarios (Aichholzer & Winkler, 2003).

As far as the benchmarking of individual e-government applications and initiatives is concerned, the European Union applies a comprehensive assessment framework for the identification of good practices, achieving impacts and delivering benefits for citizens and businesses when appraising candidates for the "eEurope Awards for eGovernment". The four main themes of the 2005 awards encompass environment maturity, back office innovation and transformation, service use as well as impact and benefits (European Institute of Public Administration, 2005). The annual "Stockholm Challenge Award" also aims to identify good practice initiatives, rewarding ICT-projects in public administration based on five criteria (innovation, convergence, inclusion, equal opportunity, and sustainability) in line with the UN Millennium Goals (Stockholm Challenge Consortium, 2005).

Giving credit to the multitude of models and metrics for the assessment of e-government development, Carbo and Williams (2004) finally devise multiple models for e-government development as the "synthesis of component relationships and component attributes from various models can be used to form an adaptive, dynamic model for a particular context based on a set of contextual parameters that will explain a specific instance of an e-government development or implementation" (p. 97-98).

Overall, as shortcomings of existing approaches to benchmarking e-government as well as alternative approaches diffuse among researchers, practitioners and decision makers (Bannister, 2004), future studies to monitor e-government development may well be expected to feature higher levels of sophistication in terms of their design, functionalities and measures. The current narrow focus of e-government benchmarking on the simple provision of online services is therefore likely to be replaced by a comprehensive evaluation framework for e-government giving credit to differing stakeholders' perspectives on certain structural components and taking into account historical developments as well as socio-economic contexts.

## CONCLUSION

A large number of surveys and reports claiming to benchmark e-government development have been conducted by global consultancies and international as well as academic institutions. These studies show substantial variations as far as their foci and methodological approaches are concerned. Hence, the study designs and key findings of three major global e-government benchmarking series have been presented in detail, in order to address the question whether these three reports represent an appropriate foundation for governments striving for the design and implementation of comprehensive e-government systems in terms of their functionalities. By adopting a holistic approach to e-government evaluation, it could be demonstrated that the representativeness of the quantitative measures applied by the three study series scrutinized remains confined to certain structural elements of e-government as well as to certain stakeholders' views.

In order to ensure the functionality of benchmarking reports in terms of initiating and pushing progress to-

wards comprehensive and sustainable e-government systems, future studies have either to be based on a holistic evaluation framework or must at least feature the embedment of their findings into such comprehensive models. Measurements of the results, effects and impacts on all groups of stakeholders must be included in order to equip governments with solid foundations for future e-government activities, priorities and objectives (Ostermann & Staudinger, 2005).

In this context, it appears "important to remember that metrics are not complete once defined" (Kunstlj & Vintar, 2004, p. 146). Even the authors of two of the e-government studies assessed demonstrate their understanding of measurement being a continuous learning process (Kunstelj & Vintar, 2004; Millard, 2003), as advances towards more complex study designs can be registered in the benchmarking series published by the United Nations and Accenture: In contrast to the 2001 UN e-government survey Benchmarking E-Government: A Global Perspective, which assessed solely the quantitative e-government index (renamed more precisely e-government readiness index in 2003), the 2003 report also includes qualitative research which feeds into the e-participation index. Likewise, the research methodology of Accenture's e-government leadership reports was extended by qualitative background research in 2002 and by quantitative research on citizens' attitudes in 2004 (Hunter & Jupp, 2002; Rohleder & Jupp, 2004; UN, 2001; UN, 2003a).

Striving for higher performance of e-government benchmarking reports will therefore lead to surveys based on a more holistic and also theoretically founded definition of e-government, which will take into consideration its objectives and characteristics as well as its stakeholders' claims, concerns and issues. In doing so, studies will have to precisely define indicators as well as methods for the assessment and aggregation of scores (Kunstelj & Vintar; 2004), explicitly stating their conceptual potentials as well as limits.

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## KEY TERMS

**Benchmarking:** A continuous and systematic process of improving strategies, functions, operations, products or services by measuring, comparing and analyzing relevant benchmarks in order to produce superior performance.

**E-Government Index:** A quantitative index developed by West assessing governmental Web sites for the presence of features specifying information availability and public access and for the number of online services offered.

**E-Government Readiness Index:** A quantitative composite index devised by the United Nations assessing the capacity of the public sector to use ICT for encapsulating in public services and deploying high quality information and effective communications tools to the public. It comprises the Web measure index, the telecommunications infrastructure index and the human capital index.

**E-Participation Index:** A qualitative index devised by the United Nations measuring the willingness of governments to use ICT to provide high quality information and effective communication tools in order to empower people to able participation in consultations and decision-making.

**Functionality:** The sum of an entity's functions and their specified properties that satisfy stated or implied needs. It refers to the usefulness or capability of the total entity, hence regarding its function from a systems-theoretic perspective.

**Operationalization:** The process of converting concepts into specific observable indicators that can be measured. Operationalization is a key component of the scientific method as it ensures the reproducibility of (results of) experiments.

**Overall Maturity Index:** A quantitative index set up by Accenture assessing the overall evolution of electronic service delivery and the overall approach of governments to managing interactions with citizens and businesses. It comprises the measures service maturity and customer relationship management.

# Global Governance as a Complex Adaptive System



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## INTRODUCTION

The recent advent of Internet technologies has greatly intensified existing globalization processes. The development of full multimedia international communications has the potential to democratize information flows. Citizens can communicate with each other and with governments to create and document public and private accountabilities beyond jurisdictional borders. Ironically, it is also now possible to achieve intensive and intrusive surveillance of individuals and organisations, virtually untraceable criminal exchanges of data, and even forms of cyberwarfare. These possibilities are all part of the global information commons. Like physical common spaces, beneficial and nefarious elements coexist. A working definition of the global information commons is the set of all information systems critical to managing global resources and governance, and the set of protocols for their exchange. While both cumbersome and broad, this definition of the global information commons helps to ground it as a concept that can be modelled and managed. It responds to Dahl's query about the possibility of a third transformation of democracy beyond the nation-state.

This article considers key issues for the emerging global information commons. These relate to the role of new technologies in possible forms of global governance. Global governance is here considered to be the emerging mechanisms for managing trans-national issues and resources. These can be particular to a specific issue or resource, such as the fisheries, or may be more formal, such as the European Union. Governance can be seen as a management function, much as the "governors" on early steam trains.

First, the author presents an overview of technology as socially determined, followed by a sketch of how global governance may be seen as a complex adaptive system. This includes an analysis of how models might embed democratic structures. Finally, examples of sub-systems of the global information commons demonstrate the range of actors and rules such a system would need to consider.

This theoretical perspective builds on empirical work in the physical, biological, and social sciences and emphasizes the value of modelling governance at all scales. This approach is seen as fruitful for identifying and monitoring dynamic patterns. It provides useful insights for managing the global information commons. In human systems, the rules of interaction and information exchange are determined by the values of the actors (Theys, 1998). Modelling can help to articulate these values. In complex human systems, the direction of change can be as important as absolute measures.

## BACKGROUND

The relationship between technology and society has long been a topic for analysis, recently stimulated by the rise of the information age. Several writers are particularly relevant for considering the role of information technology in systems of governance. Beniger (1986) showed the importance of information in all forms of evolution and control. This concept has become popularized through the study of the genetic code as a program for biological processes. Feenberg (1991) provided a critical theory of technology, and revealed how the democratising potential of information technology makes it a site for an ongoing power struggles. Sclove (1995) considered the need to embed democratic assumptions in technology design. Zuboff's (1988) concept of "informating" provides an essential learning element, which has connections to complexity theory and the developmental role of democracy and policy. A more complete review of the social determination of technology design in democratic systems of governance is provided in Geiselhart (1999). Current efforts to articulate a direction for the global information commons can be seen in the processes of the World Summit on the Information Society (http://www.itu.int/wsis/). The WSIS is in many ways a microcosm of the wider issues involving information technology and global governance.

## GLOBAL GOVERNANCE AS A COMPLEX ADAPTIVE SYSTEM

With accelerating pace over the past 20 years, awareness has grown in first the physical, and lately the social

sciences of a new and powerful way of modelling many kinds of systemic behaviour. Some have taken this metaphorically (Zolo, 1992) while others have made serious efforts at mathematical modelling (Biggs, 2001; Stocker, Green, & Newth, 2001). The author suggests this would be a fruitful perspective for examining emerging forms of global governance. Complexity theory is showing that understanding and some form of control is possible without total determinism and predictability. These revelations suit modern, information driven governments, which are often caught up in changes that outpace their ability to adapt. Many institutions, including the administrative arms of representative government were developed for a simpler, less interdependent age. Physical systems, such as climate, are also undergoing rapid transformation. There is heightened recognition of the need to find new ways of harnessing citizen knowledge and consent to achieve rapid learning and flexible response.

The section argues that in addition to aiding in understanding and possibly prediction, modelling global governance could suggest methods for integration across scales.

Traditional Newtonian concepts influenced linear, hierarchical views of social structure and management, and are now yielding to the paradigm shift associated with complexity (Becker & Slaton, 2000). Recent work on simulating social models and the spread of ideas shows that while ideas spread from one-on-one exchanges, it is the collective and cumulative interactions that lead to major shifts in perception or values (Stocker et al.). An essential observation of these systems is that a simple set of rules can generate very complex behaviours at many scales.

An "attractor" is a pattern generated by a complex adaptive system (CAS). It can form a range of behavioural loops that may be static, repeating, or non-repeating. Social structures as well as biological events can form fractal patterns, which repeat at different levels. Thus, the incidence of industrial strikes has been found to follow a power law similar to the way fires spread in a forest (Biggs, 2001). These can be the ever different but similar patterns of bureaucratic procedures or the endless reshuffling of international accreditation. Work on government (Kiel, 1996) and on organisations (Theys, 1998) suggests that in human systems the rules of interaction are driven by the values of the actors. This implies democratic values produce different patterns of governance. These interconnections are now made more obvious through digital communications. The endless data of global networks could be as useful for monitoring democratic process as for catching terrorists. Garreau (2001) describes collective global bird monitoring in terms very similar to a CAS.

The key insight for the global information commons is that patterns of authority are shifting away from monolithic nation states and towards more diverse, fractured, and trans-national sub-systems. One popular view of the changing model of governance is Rosenau's (1997) proposal that "spheres of authority" are arising as alternatives or complements to sovereign states. Rosenau describes a sphere of authority (SOA) as "emergent authority relationships."

Ernest (2001) discusses spheres of authority in some detail. He notes that "Spheres of authority may be temporal or enduring, local or global. What makes them unique is their ability to provide social goods and protections that states are either incapable of or unwilling to provide." SOAs encompass "traditional" units of analysis like intergovernmental and nongovernmental organizations, but include less structured forms of social behaviour including transnational coalitions, issue networks, and global civil society. The critical common factor is that "these SOAs create challenges to the authority of the contemporary nation-state in a wide range of issue areas, from the land mine ban to monitoring human rights conditions and governmental corruption."

Complex systems display sensitivity to initial conditions, for which humans may be read as the history of relevant events. There is a possible communication path from an individual in Iowa to the head of the World Bank, but the mapping of the rules onto the actors determines the degree of democratic governance. There can be bifurcations, such as many believe occurred with the attacks on the United States in September 2001. Fractal patterns can occur over time, and the much smaller World Trade Centre attack in the early 1990s, as well as the bombing of a night club in Bali in 2002 may all be part of the "pattern." Identification of the values driving the patterns can assist in redirecting them for more sustainable outcomes, and avoiding counter-productive responses that incite further escalations.

Not all the patterns reflect democratic values. Some exclude citizen participation, while others have the potential to override national sovereignty. Individuals form clusters, formal and informal. Organisational and institutional clusters, from a local Parent and Teachers Association to the World Trade Organisation (WTO) and the United Nations, create spheres of authority and defacto systems of governance that increasingly have digital representation or at least a fingerprint. These may or may not include provision for information and decision-making, transparency, citizen participation, and accountable evaluation of the outcomes. These concepts of global governance as a CAS are discussed more fully in Geiselhart (2004). One assumption of this theoretical approach is that democratic "attractors" for global governance will make use of negative feedback loops. In a CAS, these bring the system back to a norm, like a thermostat. Positive feedback loops, on the other hand, facilitate the system moving further from equilibrium, possibly to beyond the

edge of chaos, with the possibility of a sudden bifurcation.

## E-Governance Beyond the Nation State

E-government is evolving to deal with trans-border issues. Government responses to supra-national issues become an element in emerging forms of global governance. The patterns of digital representation and decision making have implications for the overall wellbeing and security of peoples. Increasingly, the transparency, availability, security, and accuracy of the information being shared globally underpins the effectiveness of governmental response. This applies to a myriad of socio-political-scientific issues, from climate change to terrorism to new disease vectors.

Many forms of international information management cannot be contained within national borders. These encompass the global information infrastructure itself, which, together with the rules for transmission and access, comprise the global information "commons." In addition, many other issues that governments must deal with have international informational aspects. Global e-governance is the complex of administrative, technical, and policy arrangements that collectively form a default pattern of governance on a particular international issue. The above overview of technology as socially determined makes clear that electronic representation is embedded in the human systems that give rise to them. Trans-border issues are generally subject to different constraints than are localized issues and information. The role of non-government players in the international information arenas is especially critical for international issues. Managing the information flows for supra-national issues involves both administrative and democratic accountabilities, as discussed in the following sections.

## Democratic Accountabilities of Global Information Management

As the overlap between industrial, scientific, social, and technical processes grows, so does the complexity of many issues facing governments. This makes citizens ever more dependent on information structures to participate meaningfully. Thus, governments come under pressure to make information available in ways citizens can understand and use, and to facilitate discussion and debate. As with information policy, the need for a reflexive element increases, to allow consideration of the authority and interpretation of the information. The role of intermediary institutions, such as libraries, public broadcasters and the commercial media, becomes more critical and is also caught up in the convergence of communication technologies. Outsourcing of information technology adds an extra dimension of public accountability, as the margins between private enterprise and government blur. A dense Web of communication flows and procedures for disclosure now underpins virtually all government activities, with extensive digital representation.

This complexity gives rise to issues of legitimacy, transparency, accuracy, and accountability. These concerns in turn influence information design and services. As we move further towards an information-based knowledge economy and society, the role of government as the central focus of agency, action, policy, and protection is being questioned from many perspectives. While governments are still the ultimate source of security in developed nations, this role is already deeply eroded in many parts of the world. Distrust of government is often manifested through an unwillingness to accept the validity of government information, particularly where there is suspicion about the source of the information and its benefits from government. Monbiot (2000) is just one of many authors documenting the cross-overs between government officials and paid positions in the industries or policy areas they are oversighting.

Thus representation, participation, and what have been called "democratic literacies" (Griffiths, 2003) are critical differentiators between domestic e-government and global e-government. These democratic accountabilities for information creation and distribution amount to what Ralph Nader has summarized as: Who gets to say, Who gets to know? And who gets to decide? Scaling this up to international level is a serious challenge facing the legitimacy of governments today.

In a globalised system of trade, finance, and ecology, poverty is the "weakest link," the greatest underminer of security (Thomas, 2001). The most profound evidence that democracy has structural problems is the erosion of equity within nations. It may safely be assumed that most people in a nation, state, or a city, given adequate information and effective choice, would not vote for benefits to be redistributed upwards to those more wealthy than themselves. Likewise, the growing disparity of wealth between nations indicates that mechanisms now operating to manage the flow of resources globally are not inherently democratic.

This situation is inherently destabilizing and correlates with a "democratic deficit." Indicators such as the falling levels of voting in the world's leading democracies indicate that existing mechanisms for citizen engagement cannot be taken for granted. Repeated attempts at reforming institutions such as the European Union and the United Nations indicate that current approaches to creating a global citizenry and global security may need rethinking. The current linear, hierarchical approach may be reaching the limits of functionality, given the scale of current issues and pressures for trans-

national governance. Scale was an overt concern for Dahl's (1989) analysis of democratic transformation. Electronic communications provide an avenue for new forms of engagement and participation, many of them not bounded by jurisdictional constraints. The electronic arena for such activities may be thought of as a global information commons. It may also be thought of as a complex adaptive system, with actors and rules of interaction, as the following section outlines.

## Citizens without Borders

For many issues, the global information commons allows individuals and non-government agencies to exert influence and communicate with each other. The continuum for electronic information exchange and engagement extends from a decision to donate to a distant cause through to terrorism on foreign soil. Between these extremes of charity and sociopathy lie traditional lobbying, consumer boycotts, and hactivism. Just as the WTO is free to determine fine detail of trade and production requirements in distant lands, so are some empowered individuals at liberty to take aim at and influence policies almost anywhere.

## Global Information: Areas of High Risk

These areas are indicative of the overlap between national and international information systems, and the links between these and global security. For each of these, a long list of actors contributes to the information creating a dynamic sphere of authority, with smaller similar (fractal) patterns at national and local levels, frequently with implications for individuals. Each sphere also overlaps and is interdependent on the others, as will be illustrated. For each, the key to information as global commons lies in the patterns being created at all levels and how they interact, along with the information flows and their checks and balances. Each sphere of authority contributes to global e-governance on that issue.

## International Information: Economic and Financial

The world economy is perhaps the most obvious manifestation of globalization, and the area where global e-governance is most highly coordinated. It consists of industries, flows of goods and services, resource manipulation, advertising and marketing, and consumption by governments, organizations, and individuals. Trade laws and sanctions of various kinds, unilateral, multilateral, and global, enforce and reinforce alliances or enmities. The largest industries, such as energy and agriculture, are subject to fluctuations and crises. These issues impact on the ability of less well developed nations, regions and individuals to participate in the global economy, as knowledge about innovation can itself be manipulated through legal and administrative controls, pricing regimes, and so forth.

Where representation issues have been resolved, e-governance can be quite effective. For example, SWIFT (Society for Worldwide Interbank Financial Telecommunication, http://www.swift.com) is an industry-owned cooperative that provides the information infrastructure for much of global banking and finance. The banking industry is a "virtual community," with the capacity to design and manage their information systems to the mutual advantage of stakeholders. As a cooperative, its governance structures have commonalities with democratic representation. International financial and commercial transactions have rigorous requirements for digital documentation. The forms of information security include non-repudiation, verification, and authentication. The role of the ITU and other hybrid government/industry organizations was previously described in standards for electronic commerce. These patterns of representation, negotiation, and collaboration are repeated for many other aspects of the information superstructure.

## Legal/Administrative Information

Legal matters include taxation, treaties, and intellectual property, along with judicial and criminal issues relating to extremes of behaviour, from innovation to terrorism. Collecting tax becomes more difficult when individual and corporate actors can move and conceal their money and transactions. Some nations actively provide tax havens, others seek global sanctions to eliminate them. Individuals as well as companies seek gaps in taxation monitoring and take advantage of the limited cooperation on reporting to shield their income from governments (Geiselhart & Singh, 2001). Addressing these taxation issues is a major concern for nations and relates closely to information issues relating to support for terrorism. Again, there are national and non-state actors, public organizations and underground groups that seek influence in each of these spheres. The issues are notoriously entwined. One legal/economic example is the superannuation industry. Individual citizens have accounts and accumulate funds from various employers, in addition to their own contributions. This has a government element, as the government agency sets the rules by which citizens can enter, withdraw, taxation limits, and so forth. through a range of administrative and legal issues. There is also a powerful corporate element, as there are companies, both for profit and not for profit, that manage and administer the investments of

these funds. Finally, there is also a substantial international dimension, as the funds regularly invest both on and off shore, thus bringing the superannuation fund into communication and perhaps negotiation with international governments, other legal systems, concerns about possible human rights or environmental practices, corruption, etc.

A random sampler of other legal aspects of global e-governance includes the use of biometrics at national borders; the regulation of radio frequency identification tags on consumer goods; and the next generation of spam, or spim, which is unwanted text messages sent over mobile phones. The Virtual Global Task Force (http://www.virtualglobaltaskforce.com) is an example of formal authorities harnessing the global information commons to assist them on a difficult international legal matter. This is a Web site set up by international law enforcement agencies, where children can report their suspicions about the activities of possible paedophiles. It will also help police to gather evidence.

## Environmental Information

A growing area is disaster planning, response, recovery, and evaluation. Natural and human events can disrupt the global communication system, precisely when coordination of information and response is most needed.

Information relating to environmental communications encompasses all natural resources, short term disruptive events (such as earthquakes) and medium and longer term dynamics, along with species identification, documentation and preservation, water resource allotment and management, air quality monitoring and many other issues. Information on these matters is important for the ability to preview and model scenarios, but also to adopt precautions and preventive strategies where possible. Here the global information commons includes data sharing in response to catastrophe, both human and natural, as well as recovery and evaluation to promote learning.

The outstanding global example of the environmental dimensions of information is climate change. Information on this topic is highly contested. The overlaps with economic, legal, and also health and transport are self-evident. Alliances are forged along interest lines, and each faction produces copious information to support its stand. The level of risk is extreme, and potential for harmonization is limited by the relative power of key actors. This information cascades to every level of global structure, as there is virtually no place on earth that is outside this sphere. Here, too, citizens without borders are active participants. A "shared computing" project enlisted 90,000 people in more than 140 countries to download a program that operates in the background while the screensaver is on. This helped to analyze data on climate change, with the likely side effect of increasing public awareness. See http://climateprediction.net/.

An example of government failure to deal with information management on an environmental issue may have been the tsunami of December 26, 2004. An earthquake warning system for the Pacific region was in place, and some of the affected countries were formal members. However, news reports indicated that one of the worst hit countries did not attend meetings, reply to correspondence, or provide contact details necessary to pass this information along.

## Health Information

Health is a critical integrating area for global information and governance. Health crises are by nature complex, and often defy state-centric approaches (Lee & Dodgson 2000). Nations seeking to "go it alone" during an outbreak of a new disease, for example, can endanger multiple other populations beyond their borders. Clearly, this is closely related to environment, but health issues are associated with additional information components that require global information sharing: epidemiological patterns and patterns of antibiotic resistance, new disease vectors, promulgation of best practice and economically viable approaches.

Lee and Dodgson (2000) have documented the ways in which the patterns of cholera have reflected those of globalization. They maintain that the systemic ills of globalization itself are reflected in health challenges. They observe an erosion of spatial, temporal, and cognitive boundaries. They also note a failure of the rationalist thinking that says these problems can be solved by simply adding more information, when it is the patterns of interconnection that need to be addressed. This is another way of stating the importance of management and governance procedures for the global information commons.

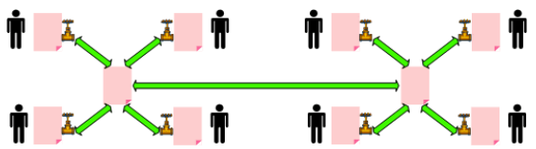
Health and administrative/legal matters are closely related, as the intellectual property arrangements for pharmaceuticals are one of the highly contested areas of trade liberalization. Again, bilateralism can dampen plurality and transparency, and result in essentially "a covert form of private governance." (Drahos & Henry, 2004).

## Transport Information

The carriage and smuggling of dangerous materials is one aspect, including radioactive substances, chemicals, machines, and equipment of warfare and weapons of mass destruction. Legal and administrative matters overlap, for example in the insurance arrangements.

The transport of people is also now a large interna-

*Figure 1. Representation of the ways groups can form membership in other groups in fractal patterns at many levels of complexity (Reed et al., 2004)*



tional trade, both legal and illegal. These people bring not just disease vectors, but challenges to cultural, welfare, political, religious, and legal situations. Tourism is not an unmixed blessing for the host nations, particularly if it encourages terrorist attacks, as in Bali when Australians and Balinese met a common fate. There have been claims that the Australian government had knowledge of the impending threat, but did not provide warnings. Around the world, more travellers are paying closer attention to whatever information sources they think can provide a margin of safety through information about such matters.

## FUTURE TRENDS

Given the paradigm shift towards a complex adaptive systems approach in recent years, it is likely modeling of global governance will become incorporated in other social forecasting processes over the coming decade. This perspective will inform protocols for the democratic management of the global commons**.** The Internet will continue to play a vital role in increasing transparency about government information management (for example, Epstein, 2004).

Figure 1 illustrates how actors at different levels or scales of influence might combine to determine the processes of information exchange. This figure is part of important work now being done on the role of open standards and social networks in developing trust relationships for Internet governance (see Reed, Le Maitre, Barnhill, Davis, & Labalme, 2004).

## CONCLUSION

This article has argued that democratic governance should be foremost in considerations of the global information commons. The sections above showed that e-government is now more diffuse, particularly for the many issues that overlap national boundaries. When driven by democratizing values government information becomes a tool to identify, manage and defuse risk. The alternative is information as weapon and control, ultimately destabilizing when governments are unable to harness the new integrating dynamic. More optimistically, new forms of organization are emerging that provide citizens without borders with the information tools to help shape and manage the global information commons. Modelling these systems can help to articulate the values underpinning them and identify critical issues and dynamics.

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## KEY TERMS

**Complex Adaptive System:** One based on agents and rules for interaction, typified by evolution and unpredictability.

**Democratic Deficit:** The gaps between formal democratic processes and government functioning and accountability.

**Digital Divide:** The gap in communications technology knowledge, skills, and use between different groups.

**Fractal:** Patterns that repeat at different scales, such as a coastline, or behaviours and institutions.

**Global E-Governance:** The electronic dimensions of emerging mechanisms for managing trans-national issues and resources.

**Global Information Commons:** The set of all stakeholders for information related to triple bottom line global resource management, the rules and protocols for transmission, distribution and accountability of this informa-

tion, and the emergent properties of the resulting patterns of resource management.

**Globalisation:** The process of increasing interdependency among countries, accompanied by convergent patterns of economic development and technology use.

**Globalisation:** The process whereby production, ownership, information, wealth, and control are increasingly concentrated and geographically integrated.

**Open Source:** An iterative, non-hierarchical approach to developing intellectual property, based on wide collaboration and freely shared information.

**Triple Bottom Line:** Accounting procedures that include economic, environmental, and social elements.

# Governance and Design Issues of Shared Service Centers

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## INTRODUCTION

In the current economic climate, public administrations are looking for ways to improve their service provision and to increase their efficiency. A great long-term public sector concern is the need for restructuring structures and processes to improve efficiency and effectiveness (Beynon-Davies & Williams, 2003). Shared service centers (SSCs) are gaining importance in public administration as a means to innovate, reduce costs, and increase service levels (Janssen & Joha, 2004b). The SSC is a business model in which selected functions are concentrated into a semi-autonomous business unit with management structures that promote efficiency, value generation, and cost savings in a manner akin to companies competing in an open market (Bergeron, 2002). By unbundling and centralizing activities, the basic premise for a SSC seems to be that services provided by one department or agency can be provided to others with relatively few efforts. Within public agencies there is a debate about which kind of services are suitable to share, how to obtain the expected benefits and how to organize SSCs. Currently, SSC implementations include several, relatively easy-to-standardize, functions like the concentration of administrative processes for handling human resources and procurement for all ministries, and the maintenance and control of information systems of several local agencies in a SSC (e.g., http://www.sharedservicesbijdeoverheid.nl/).

Clearly, there is no one-size-fits-all business model that incorporates all benefits and has no negative aspects. The *goal* of this research is to explore the concept of shared service centers and to present an overview of critical research issues with respect to its governance and design.

The structure of the article is as follows**.** In the following section, we discuss the theoretical background. Thereafter we present the main drivers for shared service centers. Section four provides an overview of the critical research issues and in section five we present future trends. Finally in section six, conclusions are drawn.

## BACKGROUND

There are many theories underpinning the sourcing, an overview of the various theories is shown in Table 1. The basic idea of outsourcing is based on the *transaction cost theory* (Coase, 1937; Williamson, 1975). Transaction costs result from the transfer of property rights between parties and exist because of friction in economic systems. A firm will tend to expand until the cost of organizing an extra transaction within the firm becomes equal to the costs of carrying out the same transaction on the open market. The use of communication networks and integration technology will decrease the transaction costs enabling organizations to source functions and to focus on their core competencies.

*Principal-agent theory* deals with the relationship between the principal and agent based on the division of labor, information asymmetry and environment and partner behavior (Jensen & Meckling, 1976). Both the transactions cost and principal-agent theory are based on rationality, an efficiency criterion is used for explaining outsourcing structures.

*Political organizational theories* are used for explaining organizational arrangements and include social, coordination, risk, and strategic management theories. These view actors as political entities having different degrees of power. Political theory, especially *resource dependency theory* (Roy & Aubert, 2002), is used to explain motives for outsourcing. Both resource dependency theory and *core competency theory* explain that companies should retain core capabilities, but non-core capabilities do not have to be owned or controlled. *Social contracting theory* addresses the view that moral and/or political obligations are dependent upon a contract or agreement. *Coordination theory* is about the management of interdependencies between organizational business processes (Malone & Crowston, 1994).

There are specific differences between sourcing and shared service center arrangements (Janssen & Joha, 2004a, 2006), which also have consequences for the way

*Table 1. Driving theories behind sourcing issues (based on Lee, Huynh, Kwok, & Pi, 2003)*

| Sourcing issues | | Driving Theory | Driving Motto |
|---|---|---|---|
| **From** | **To** | | |
| Make-or-Buy | Motivation | Resource-based theory<br>Core competencies theory | Activities should be performed either in-house or by suppliers. |
| Motivation | Scope (options) | Resource dependency theory<br>Transaction cost theory | Achieving efficiency depends on balancing the risks and benefits. |
| Scope (options) | Performance | Coordination theory | No one can assure an effective performance regardless of selected options. |
| Performance | Insourcing/ Outsourcing | Transaction cost and Principal-agent theory<br>Power-political theory | How do we know an outside vendor is more efficient than internal functions? |
| Insourcing/ Outsourcing | Contract | Principal-agent theory<br>Social contract theory | We no longer produce for ourselves everything we need to thrive. |
| Contract | Partnership | Social exchange theory<br>Coordination theory | The acquisition of services or products is through continuous interactions between the parties based on mutual benefit. |

a SSC has to be embedded within the organization. The design of SSC business models is influenced by the services and characteristics of public agencies and people involved. The governance of the SSC is dependent on a large number of aspects, including the type of services, the primary motives to implement the SSC, the frequency of change and adoption, and the type of relationship.

## DRIVERS FOR SHARED SERVICE CENTERS

The rationale for shared service centers can be explained by combining two emerging trends: (1) the technological evolution and (2) globalization and the focus towards standardization. Organizations are always attempting to find the ideal organizational structure, certainly in times of economical pressures and global competition.

During the 70s, the centralized structure was the common way of organizing companies. Centralized operations are characterized by substantial economies of scale, as procurement of products and services is possible on the broadest scale within the organization. Moreover, a unified approach to architecture and standards reduces integration difficulties and costs for new applications. However, the disadvantage is that centralized decision-making results in a slow response time and is not flexible since each business unit often has different or conflicting needs.

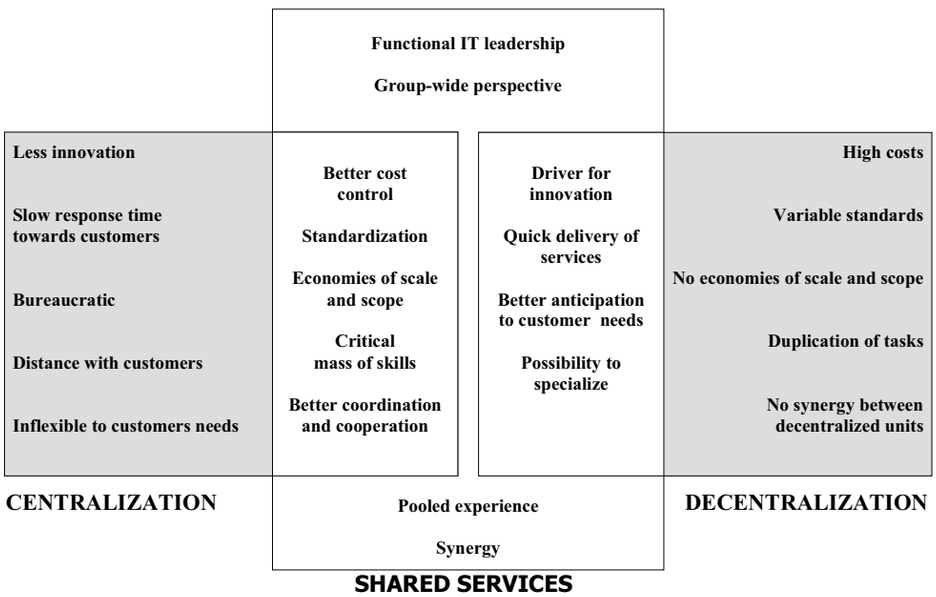
This explained the trend towards decentralization during the early 80s, where the business units were able to anticipate faster and more flexible to (new) market developments. The main disadvantage associated with decentralization is the fact that the company as a whole will have higher total procurement and operations costs due to inefficiencies related to the duplication of data centers and of multiple independent procurement and multiple suppliers.

The drawbacks, which initiated the decentralization phase in the 80s, have been overcome using modern information and communication technology. Information can be transferred and received very quickly and from every single place and most processes can be standardized, as they require limited business specific knowledge. This has resulted in a different organizational arrangement, which already started during the mid 90s, but is now attracting full attention: shared service centers. The selected government services supporting the business processes of local, decentralized, agencies are centralized into a semi-autonomous business unit or organization.

SSCs should provide the best elements of a centralized and decentralized world to accomplish efficiency and simultaneously increasing the customer-orientation (Janssen & Joha, 2006). Figure 1 shows the different characteristics of centralized and decentralized operations in terms of advantages and disadvantages.

Obtaining all the advantages of both centralization and decentralization is extremely difficult (Janssen & Wagenaar, 2004) and requires at least an effective management structure addressing a number of critical success factors (Janssen & Joha, 2004a). A lot of efforts are necessary to adapt and adopt the new organizational arrangements, coordination mechanisms, new processes, and the allocation of responsibilities. Motives to implement a SSC are to some degree conflicting and therefore difficult to combine in practice (Janssen & Joha, 2004b).

*Figure 1. Shared services should combine the advantages of both centralization and decentralization (based on Hodgkinson, 1996).*




For example accomplishing cost reduction, service improvement, and innovation requires conflicting governance mechanisms.

SSCs might be viewed as a risk to smooth operations not evaluated by researchers yet. Sourcing of systems development is sensitive to risks, as sourcing of certain services can involve the loss of technological or organizational (core) competencies that are crucial in ensuring the long-term operation (Roy & Aubert, 2002). There is still no evaluation framework including factors influencing costs, benefits, and risks.

## CRITICAL RESEARCH ISSUES

There is still a debate about the specific meaning of information technology (IT) governance, resulting in a lot of different definitions and frameworks, especially outside the scientific arena (van Grembergen & Haes, 2004). Although governance definitions differ in some respect, most of them focus on achieving the link between business and IT. The IT Governance Institute (2001) defines IT-governance as the leadership and organizational structures, processes and relational mechanisms that ensure that the organization's information and communication technology sustains and extends the organization's strategy and objectives. Governance is the system and structure for defining policies, monitoring and controlling policy implementations, and managing and coordinating the procedures and resources aimed at ensuring the efficient and effective execution of services. The design of a SSC, the resulting blueprint, can be viewed as one of the aspects of governance, as a SSC is often used to align the organizational strategy with its technology. The development of a holistic governance framework, combining the best of the existing governance models, is a challenging research topic.

We will use the taxonomy suggested by Baldwin, Irani, and Love (2001) into four categories, (1) *strategic and organizational,* (2) *political*, (3) *technical*, and (4) *economical* to further elaborate on the critical research issues related to shared service centers and their governance. A summary of these issues is depicted in Table 2.

### Strategic and Organizational Issues

The way the SSC supports the business does have major consequences for the way it should be embedded in the organization. First has to be determined what the specific objective of the SSC should be such as cost reduction, service improvement, or innovation. It is still not evident whether all advantages can be combined and achieved

*Table 2. Critical research issues of shared service centers with respect to its governance and design*

| **Strategic and organizational governance and design issues** | **Technical governance and design issues** |
|---|---|
| • Possibility of combining different motives and the design method to accomplish these motives<br>• Feasibility evaluation of a SSC<br>• Services appropriate for SSCs<br>• Roles and responsibilities<br>• Analysis of the different SSC archetypes<br>• Governance structure (e.g., pricing models) | • Necessary IT infrastructure and flexibility<br>• What technology can be shared and to what degree<br>• What is the role of interfaces<br>• Disaster recovery and business continuity planning<br>• The influence of the ICT infrastructure on the implementation of SSCs |
| **Political governance and design issues** | **Economical governance and design issues** |
| • Career options within a SSC<br>• Strategies to cope with resistance and effectiveness of those strategies<br>• Informal communication structures<br>• Expectation management<br>• Accountability | • Feasibility study of a SSC<br>• Analysis of combining different motives and the effectiveness of the SSC operations<br>• Quantitatively analyze the difference between SSC and outsourcing arrangements<br>• The evolution of an SSC from an economic perspective (efficiency, economies of scale) |

and which factors are of importance to meet a specific objective.

Another strategic aspect is the kind of services that are suitable to concentrate and transfer to a SSC. The type of services depends on the specificity, the scope, and the scale of the service, but also on the willingness, resistance, and culture of the people involved. The degree to which it is possible to standardize the specific service depends not only on technical limitations, but also on how many people are willing to accept it, which also limits the economies of scale. All these aspects should be quantitatively analyzed in order to determine whether an SSC is feasible.

The configuration of the SSC business model to ensure a good and effective delivery of services is also a major research issue. Strikwerda (2003) provides a classification of SSC archetypes as a (1) staff department, (2) internal joint venture, (3) infrastructure facilities for multiple business units (BU), (4) a center within one BU, (5) service firm, which is similar to outsourcing arrangements, and (6) joint venture with an outsourcing vendor. Figure 2 gives an overview of the SSC archetypes and combinations can also be found within large organizations. There is no theory addressing which is the best archetype given certain circumstances, although Strikwerda (2003) provides several factors that might influence this choice: economical pressures, strategy and capability of the board of directors, and the degree of resistance.

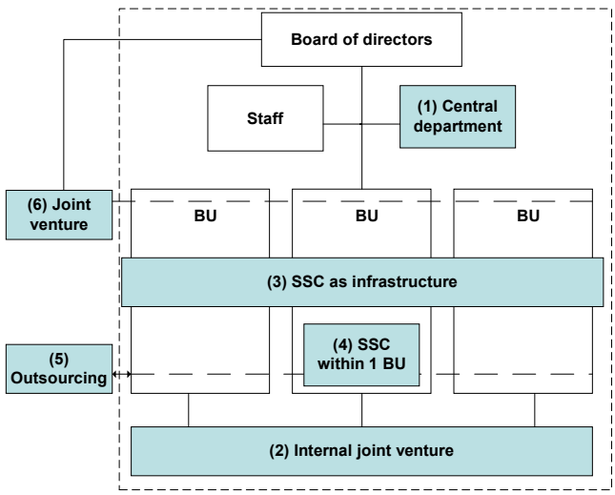
Governance aspects of SSCs are hardly known. The specific archetype that has been chosen will have consequences for policymaking and accountability, making it clear to whom the shared service center reports, and what its specific responsibilities are. New roles and processes will have to be introduced to govern the policy and structure and to continually elicit new and update existing customer requirements, monitor customer satisfaction and service quality and to react quickly in case of support needed or calamities. The way the organization has to be structured in terms of roles and responsibilities and the factors determining the relevance and location of those roles is also a topic for further research. Also of interest is whether the specific organizational form of the SSC does have consequences for the specific advantages that can be achieved.

Other governance issues that need to be addressed are related to pricing models: Will prices be paid per fee? Will pricing be competitive in open markets? Will pricing be tailored to customer demand? It is not yet clear which pricing structures can be adopted and what governance model fits best for described forms.

## Political Issues

The dependency on the internal resources and people within SSC arrangements is extremely high and therefore essential. Local departments are frequently not willing to

*Figure 2. Archetypes of SSC business models (based on Strikwerda, 2003)*




give up some of their autonomy. It is yet not clear which strategy should be adopted to cope with the initial resistance. Two opposing strategies are present in the literature: the big bang strategy and the incremental strategy. One solution suggested is to combine those strategies. Strikwerda (2003) provides several other alternatives to diminish the initial resistance. For example by defining such extremely high performance levels, that the business units might feel the need to cooperate. Another is that the chosen SSC activity is so expensive and complicated, that the business units are very much willing to concentrate it within a SSC. Research is necessary to identify the different strategies to cope with resistance and to analyze which specific strategies are most appropriate and effective given the specific circumstances.

A first step towards a framework to analyze the SSC governance based on the analyses of the relationship between stakeholders is provided by Janssen and Joha (2004a). They use the following six dimensions of outsourcing relationships introduced by Kern & Willcocks (2001): SSC intent, contract, structure, behavior, interactions and efficiency & outcome. They found that managing expectations is of major importance, which not only includes formal but also informal communication. The way this communication arrangement has to be structured and the important juridical and contractual aspects also need further investigation. Coping with the so-called "soft" side is of major importance to get the SSC accepted, to implement an effective governance structure and to achieve the expected benefits.

## Technical Issues

Advances in information and communication technology have enabled the emergence of SSCs. A well functioning ICT infrastructure is a necessary condition for establishing a SSC. This not only includes the technical platform, but also software and interfaces. The SSC should also be able to technically cope with contingencies, such as mergers and acquisitions and therefore requires an adaptive architecture. Failure of services provision can result in a shut down of critical operations and result in a major loss of productivity at business units. The management of the SSC should take measures like having duplicate versions of systems and an emergency communication network to avoid the single-point-of-failure problems. The approach to disaster recovery and business continuity planning is therefore an interesting subject of investigation. Other research issues here are related to the infrastructure: What ICT is at least necessary for SSCs? What technology is suitable for sharing services? The design of the (necessary) ICT infrastructure not only determines whether a SSC is possible and viable, but also how it should be implemented.

## Economical Issues

From a macro organizational economic perspective, it has to be determined whether the SSC is feasible. Such a feasibility study should include different analyses, for example, costs of technology adaptations, costs of chang-

ing or modifying facilities, and customer satisfaction with current services or potential shared services. The major cost factors have not yet been fully understood. Also related to this is whether it is possible to combine different specific motives, and when yes, to what degree. From an economic perspective, it is of interest to analyze whether the nature of a SSC changes over time in terms of economies of scale, efficiency, and governance, and in what way it evolves. Finally, the difference in efficiency between SSC and outsourcing arrangements is an interesting research subject in order to analyze the benefits and risks quantitatively. An efficient working governance arrangement is essential for establishing cost efficient operations, as is a balanced tradeoff between flexibility and standardization with respect to the SSC service delivery.

## FUTURE TRENDS

Shared service centers do not provide the final answer to the debate about the ideal organizational form. Two clear trends seem to be emerging. The first is further consolidation efforts using SSCs aimed at improving citizen-centered business processes. The use of shared services has to a large extent been limited to easy-to-standardize services. In the future, public agencies like municipalities might share complete back-office functions and processes and concentrate them in SSCs. These services can be customized to the local situation of public agencies. Related to this is the concentration of seemingly different services into one SSC, such as finance and accounting and parts of human resources services, thereby capturing even more economies of scale and integration advantages.

The second trend is to enlarge the search for new related organizational forms such as outsourcing, off shoring, Business Process Outsourcing (BPO), virtual and cross-national SSCs and other mixed forms. By outsouring or off shoring specific parts of an SSC, even more benefits might be gained. In this respect, SSCs might even just be a transition step towards other business models.

## CONCLUSION

The quest towards shared service business models has just started and there remain many research questions to be solved. In this article, we explored the concept of shared service centers and presented an overview of research issues related to the governance and design of SSCs. The main research questions are clustered into four categories, (1) strategic and organizational, (2) political, (3) technical, and (4) economical research issues.

To obtain the promised benefits of SSCs and avoid the risks, the right design trade-offs and decisions have to be made influencing the performance and success of SSCs and an effective governance structure should be implemented. There still is a need to further investigate the governance and design issues of shared service centers and the major factors contributing to success and failure.

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## KEY TERMS



**Business Process:** A business process is a sequence of tasks, initiated by an event and aimed at providing products or services.

**Coordination:** Coordination is the management of dependencies between business processes.

**Cost Center:** An accounting term that refers to a department or function in the organization that does not generate profit.

**Governance:** The system and structure for defining policy, monitoring and controlling the policy implementation and managing, and coordinating the procedures and resources aimed at ensuring the efficient and effective execution of services.

**Shared Services:** Shared services are services shared by multiple users.

**Shared Service Center (SSC):** The SSC is a type of business models in which selected services are unbundled and concentrated into a semi-autonomous business unit or organization. Other business units and/or organizations can share those services.

**Sourcing:** The decision process of identifying and selecting potential, internal and external, suppliers of specified services.

**Transaction Costs:** Transaction costs result from the transfer of property rights between parties and exist because of friction in economic systems.

# The Government E-Procurement System in Korea

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## INTRODUCTION

Korea launched a national e-procurement system on September 30, 2002. The adoption of the e-procurement system in the government of Korea has been acknowledged as successful. This article presents a case study describing the public e-procurement system of Korea, analyzing the development process, and determining factors in the successful adoption of the system. The Government E-Procurement System (GePS: www.g2b.go.kr) is a portal site providing information on public procurement and an application service provider for public procurement as a whole. GePS advances procurement services by reducing paper work and red tape, expanding the range of commodity selection, and standardizing services. Government-wide support, including that of the president, had an instrumental role towards the successful adoption of GePS. The high capacity of information technology and institutional collaboration among public agencies were other foundations for the successful establishment.

## BACKGROUND

Electronic procurement (e-procurement) has become more significant in both public and private organizations. For example, "The Advantage System" of the United States General Service Administration has been assessed as a "limited success" and been recommended for development in terms of a "comprehensive business strategy" by the General Accounting Office (GAO, 2003). The Integrated Acquisition Environment of the U.S.—the federal government's e-procurement initiative anticipates creating a single Web-based portal site (Drabkin & Khi, 2003). The Commonwealth of Virginia's e-procurement solution, eVA has been identified as a good e-procurement system (Eakin, 2002). Yet, it is very hard to find good e-procurement models at the federal level, especially the national level including local governments and state-owned enterprises.

A number of components characteristic to fully developed electronic government procurement systems have been specified (Talero, 2001). In e-procurement systems, e-tendering has more phases—registering, opening a bid, contracting, documenting, and tracking—whereas e-purchasing is based on transaction modules, which are rather compact processes, like e-catalogues (World Bank, 2003). Experts on procurement systems have paid more attention to tendering methods because they deal mostly with high value and low volume goods and services—blue collar MRO (Maintenance, Repair and Operation), which is believed to be more important (Neef, 2001).

The new paradigm of public procurement, e-procurement, is a managerial innovation of the government. It is not only a technical adoption but also an organizational change—from meetings arranged to personally conduct a transaction through to electronic transactions.

It was the same in Korea. Public Procurement Service (PPS) already had started to digitalize procurement services by adopting EDI in the late 1990s based on its own plan. PPS had much interest in improving transparency and efficiency of the public procurement, as the centralized procurement agency in the Korean government, which shares 30% of entire public procurement. PPS completed its own system in 2001 including e-bidding, e-contracting, e-purchasing (e-catalogues), e-payment, and so forth. But the system was not the integrated e-procurement services for all suppliers and buyers at that time. Therefore, the Korean government decided to establish a nationwide e-procurement system to overcome this weakness.

## DEVELOPING GePS IN KOREA

The development of GePS was initiated as a national project of e-government policy and is now a part of the national IT policy. Recent government policies were introduced in the Master Plan for Informatization Promotion from 1996 to 2000 and "Cyber Korea 21" from 1999 to 2002 (NCA, 2003). The Special Committee for E-Government selected 11 e-government projects, including GePS. The benefit of GePS is expected to cross over into all public agencies and the private sector. On the other hand, the experiences and achievements of PPS were thought to be the success factors for the project.

Those are the reasons the special committee selected GePS as a major project for e-government. Without the initiation and supports from the special committee, it might be hard and take longer to develop GePS. For the business process reengineering (BPR) of GePS, three government ministries were involved—the Ministry of Planning and Budgeting (MPB), the Ministry of Information and Communication (MIC), and the PPS. The BPR/ISP(Information Strategy Plan) report outlined the strategies for e-procurement system build-up, the result of procurement service innovation, standardization of documents and catalog, e-procurement system plans, and recommendations on legislation for e-procurement (Seong & Lee, 2004).

All expenses for the development of GePS were financed through the Informatization Promotion Fund (IPF, Special Committee for e-Government, 2003) based on the Framework Act on Informatization Promotion of 1996. The special committee for e-government, MPB, MIC and NCA concluded that the development of GePS should be funded by IPF rather than solely PPS as the project was expected to reap the government-wide benefits.

One important strategy for implementing e-procurement system in government is how to institute legal and accountability mechanisms (Moon, 2002). In order to increase the number of transactions through the e-procurement system and to prevent abusive and fraudulent transactions, laws and regulations on public procurement should be revised. The digital signature is one of the good examples. The electronic documents including bids with digital signature have the same validity with the paper documents with the signatures.

The most significant change is that procurement laws require most public agencies to account for bids through GePS. As a result, most information on public purchases and contracts can be collected onto GePS and the number of participants in public procurement via GePS has increased.

## MAIN FUNCTIONS AND ACHIEVEMENTS

GePS provides information on public procurement for both of centralized and decentralized procurement. GePS is a public cyber-marketplace, whereby a single focal point allows a variety of suppliers and buyers to simultaneously meet and conduct a range of electronic business types. The main services of GePS include (1) helping public organizations' procurement in terms of contract request, bid, contract, payment request and follow-up management; (2) serving as a single point of business registration for entering the public procurement; (3) providing information on companies regarding business ID certificate, national tax payment certificate and qualification; (4) reporting contract performance; (5) issuing various notices related to procurement; (6) managing an e-shopping mall for PPS's supply of contracted products; and (7) sending procurement requests from public organizations to PPS (PPS, 2003).

GePS is a secure and convenient universal system designed to assist both public institutions and businesses with all public procurement tasks. The systems of 53 other institutions such as the Ministry of Government Administration and Home Affairs are linked with GePS to share information. The Government for Citizen Systems (G4C) of the Ministry of Government Administration and Home Affairs provide tax records and necessary information for registration. The National Finance Information System (NAFIS) provides real-time information on the finances of government agencies. Six construction-related associations are connected for obtaining information on contract bidders; ten guarantee corporations are involved for receiving contract deposits; six certified authentication institutions assist in verifying digital signatures; the Korea Financial Telecommunications & Clearings Institute provides services for e-payment with fifteen commercial banks; and the National Computerization Agency (NCA) provides public key infrastructure for e-bid cryptography.

PPS has eliminated or reduced the need for submission of all documents by sharing information such as business registration certificates and financial information online. Contracts can be established electronically and contractor payment can be made via online banking.

The general workflow of e-procurement through GePS is described in Figure 1, though procuring processes differ slightly depending on the object to procure–goods, services, or facilities.

*Figure 1. Workflow of e-bidding and links with other systems*

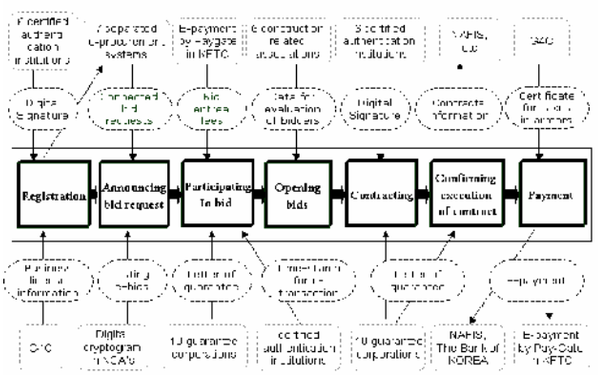

*Table 1. E-bid in GePS (FY, 2003)*

| | Biddings (cases) | Participants (thousands) | Transactions (million $) |
|---|---|---|---|
| Total | 99,020 | 15,404 | 17,190 |
| Monthly | 8,252 | 1,284 | 1,433 |
| Daily | 330 | 51 | 57 |

Since the launch of GePS, procurement services have been mostly delivered through GePS. The data from PPS shows the contribution of e-procurement to the procurement services.1 For one fiscal year–from January 2003 to December 2003, GePS took the charge of most public procurement services. Total amount of procurement through GePS reached up to 31.6 billion dollars. E-bid accounted for up to 92% of all biddings. As Table 1 shows, 99,020 notices of e-bid were electronically placed on GePS. 15.4 million participants have been involved in e-biddings and 17.2 billion dollars has been transacted through e-bidding systems of GePS.

Table 2 indicates that 98% of orders from public agencies were made at the e-shopping mall for the pre-contracted items in GePS. Only 2% of orders were based on paperwork. The rate of electronic orders considerably increased after launching GePS—from 81% in 2002 to 98% in 2003. On average, 15 million dollars was ordered a day through the e-shopping mall of GePS.

As of December 2003, 25,529 public organizations with 39,885 users and 92,042 private firms with 116,681 users participated in the new procurement systems. The public organization users included 3,728 central government agencies, 5,535 local government agencies, 9,396 schools from elementary schools to universities, and another 6,870 public enterprises.

GePS has enhanced public procurement administration and service in terms of productivity and transparency. It has realized annual transaction cost savings of $2.8 billion, due to the digitalized processes and integrated information. In particular, 90% of the total amount, or $2.5 billion of business expenses was saved in terms of time and transportation. Public organizations saved $300 million primarily due to the reduced burden of information acquisition and visits to public offices. GePS also provided information in real time and expanded the provision of information on private contracts. This promoted fair competition with a reduction in direct contact between business people and public officials and thereby significantly reduced the possibility of corruption.

*Table 2. E-shopping mall in GePS (FY, 2003)*

| | Orders (cases) | | | Transactions (million $) | | |
|---|---|---|---|---|---|---|
| | Total (A) | GePS Shopping Mall (B) | Ratio (B/A, %) | Total (A) | GePS Shopping Mall (B) | Ratio (B/A, %) |
| Total | 462,274 | 454,831 | 98.4 | 4,474 | 4,367 | 97.6 |
| Monthly | 38,523 | 37,903 | - | 373 | 364 | - |
| Daily | 1,541 | 1,516 | - | 15 | 15 | - |

In the technological point of view, PPS has adopted advanced standard solutions for exchanging documents since 1997. The initial e-procurement system has taken advantage of the electronic data interchange (EDI) for the electronic transmission of business data. Since the development of the Extensible Markup Language (XML) in the mid-1990s, the e-procurement system has had simple and affordable solutions for secure exchange of transactional business data (Neef, 2001). GePS was developed with electronic documents based on the XML Schema from the World Wide Web Consortium (W3C) as well as the Core Component method from Electronic Business Extensible Markup Language (ebXML). Simple object access protocol (SOAP) from Microsoft and ebXML message service specification (MSS) are used for messaging. In addition, GePS employs standardized documents for electronic transactions, which are shared among public agencies. PPS has also participated in the United Nations Center for Trade Facilitation and Electronic Business (UNCEFACT) for universal standardization of ebXML documents.

## REPUTATIONS FROM THE INTERNATIONAL COMMUNITY

The United Nations (UN) Division for Public Economics and Public Administration announced PPS as the recipient of the United Nations Public Service Awards for 2003 (UNDESA, 2003). According to the UN, PPS has reorganized the procurement service by converting to e-commerce and is expected to save $2.8 billion annually. Other international organizations, including the World Bank, have shown interest in GePS since the system is expected to save costs, increase transparency in government purchasing and refine contract processing.

Moreover, the Organization for Economic Co-operation and Development (OECD, 2004) evaluated that GePS has a “strong pull-through effect on information and communications technology use in the private sector” and “no further action is required.”

According to the UN Global E-Government Readiness Report 2004, GePS was referred as the best practice model for e-procurement in the world. The report noted that one pattern of e-government development across the world has been to adopt an integrated portal approach to ensure easy navigation and reflect the commit-

ment of governments to facilitate civilian access by ensuring all information and services available through one stop shop sites (UNDESA, 2004). It is one of the GePS's strongest features.

## FACTORS FOR SUCCESS

The most important factor for the successful adoption of GePS has been the endorsement from the President and collaboration amongst government ministries. Korea established the Special Committee for E-Government as a top task force for promoting e-government under the President. Collaboration amongst the interested parties from the public and private sectors is one of the critical success factors, since data sharing and user input are crucial.

The rapidly grown capacity of the IT industry in Korea has supported e-government projects. E-procurement systems are required to be secure, efficient, and effective. GePS has solved its technical problems by utilizing high-tech applications and worldwide standards for business in Korea. For authorization, public key infrastructure has been adopted, which is used for authorized certificates and cryptographic algorithm. In terms of commodity information and code management in GePS, PPS introduced the United Nations Standard Products and Services Code (UNSPSC), used in e-commerce throughout the world.

Most importantly, a well-developed Internet infrastructure is another key factor for success. Korea has bridged the digital divide between different regions and companies as a result of the 30 million Internet users (65.5% of the population), 11 million households with broadband Internet subscribers (75%), and so forth.

The coordination amongst agencies' interests and support from these agencies is another critical factor. During the first period from April 2001 to January 2002, there were nine ministries involved in designing and developing e-procurement systems, including MPB, MIC, the Ministry of Commerce, Industry, and Energy (MOCIE) as well as PPS. As mentioned before, the GePS project is related with other e-government projects—G4C projects, NAFIS, e-document and e-signature, and government-wide computer network projects. GePS is one of 11 e-government projects, which was directed by the Special Committee for E-Government. This special committee supervised by the Presidential Commission on Government Innovation has assumed the role of coordinating organizations involved in GePS development.

## FUTURE TRENDS

PPS has provided customized information by establishing the customer relationship management (CRM) based on the infrastructure of data warehouse since September 2004. In December 2004, it also adopted the mobile e-bidding system, thus making it easier to use GePS whilst on the move by providing mobile services through wireless tools such as PDAs. PPS will extend the Ubiquitous services including the RFID.

GePS could be improved by adopting new technologies including the Desktop purchasing with Web Service and expanding the integrated use of information and services with other public information systems. Besides the ICT, PPS will develop more complicated services including consulting, analyzing the specification, and total services from planning to inspection.

## CONCLUSION

New technologies do not guarantee the success of e-procurement systems. E-procurement systems are expected to save costs, prevent corruption, and stimulate business as well as streamline the administrative process. Institutional collaboration such as revising laws and regulations as well as public agencies' cooperation in e-procurement systems have been equally matched with the development of GePS.

Responding to the demands from public agencies and firms and with their support, PPS has constantly reformed the procurement processes with the use of information technology. For the sustainable development of GePS, further research is required. There is the possibility of a business model or profit model within GePS. GePS also needs to re-establish the relations with other public e-government systems. After the implementation of GePS has been thoroughly established, evaluation on the performance of GePS and other issues on capacity-building will be required.

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## KEY TERMS

**ebXML (Electronic Business Extensible Markup Language):** A modular suite of specifications that enables a standard method to exchange business messages, conduct trading relationships, communicate data in common terms and define and register business processes.

**G4C (Government for Citizen):** One of the e-government projects in the Ministry of Government Administration and Home Affairs of Korea which provides tax records and necessary information for registration.

**GePS (Government E-Procurement Systems):** A portal site providing information on public procurement and an application service provider of public procurement in Korea.

**NAFIS (The National Finance Information Systems):** Within the ministry of finance and economy of Korea—provides real-time information on finances of government agencies.

**PPS (Public Procurement Service):** The centralized procurement agency of Korea.

**SOAP (Simple Object Access Protocol):** SOAP is a lightweight protocol for exchange of information in a decentralized, distributed environment.

**UNCEFACT (United Nations Center for Trade Facilitation and Electronic Business):** UN's standard body which encourages close collaboration between governments and private business to secure the interoperability for the exchange of information between the public and private sector.

**UNSPSC (United Nations Standard Products and Services Code):** A cross-domain classification for products and services used in e-commerce.

# Government E-Procurement through the Internet



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## INTRODUCTION

Electronic procurement (e-procurement) is one business-to-government e-commerce venture that can benefit from the Internet. Government e-procurement is different from private sector e-procurement because of concepts such as value for money, transparency and accountability, which may be considered the main benefits for the public sector. Public sector organizations have to meet multiple, often conflicting goals, and they are subject to constraints of a financial, legal, contractual, personnel and institutional nature. In addition, radical process changes from e-procurement can only be achieved with deep changes in bureaucratic practices. These changes cannot normally be achieved without either changes in the law or privatization (Panayiotou, Gayialis, & Tatsiopoulos, 2004).

## BACKGROUND

One definition of e-procurement is any technology designated to facilitate the acquisition of goods by a commercial or government organization over the Internet (Davila, Gupta, & Palmer, 2003). E-procurement technologies are focused on automating workflows, consolidating and leveraging organizational spending power, and identifying new sourcing opportunities through the Internet. In this article, I focus on the use of the Internet for the procurement process. However, there are other electronic technologies for not discussed in this article because of space limitations, such as phone or voice-over-Internet-protocol (VoIP).

The World Bank (2003) working group on government e-procurement defines it as the use of information technology (IT) (especially the Internet) by governments in conducting their procurement relationships with suppliers for the procurement of works, goods and consultancy services required by the public sector. Government e-procurement breaks down the space and time and allows for a more transparent and efficient information flow and wider access to information and services.

Moon (2003) defines e-procurement as a comprehensive and systematic process in which governments either establish agreements for the acquisition of products/services (contracting) or purchase products/services in exchange for payment (purchasing) using IT systems. According to Moon's definition, e-procurement uses tools such as electronic ordering, purchasing cards, reverse auctions and automatic accounting systems, and goes beyond just using the Internet for the procurement process.

The Internet is an extremely low-cost communication medium that provides access to the Web and differs from other communication media. Digital communication is more malleable, meaning it can easily be retrieved, stored, indexed, transmitted and revised. In fact, Gartner Group predicted that government-to-business e-procurement spending would expand dramatically from $1.5 billion in 2001 to more than $6 billion by 2005 (Gansler, Lucyshyn, & Ross, 2003).

E-procurement had seen rapid development before the economic recession in the United States (U.S.) in early 2000. Although much of the initial growth has slowed, all state governments are at least maintaining a Web presence in their procurement function, and some states are participating in Internet bidding (Moon, 2005). The findings of a 2003 national study by the National Association of State Purchasing Officials (NASPO) indicate that there is much room for advancement in e-procurement (NASPO, 2003). Less than one-quarter of the surveyed states' central procurement offices conducted solicitations via the Internet. The potential for economies of scale because of e-procurement is profound, but obviously underutilized in these governments. Part of this may be attributed to differences in management capacity in governments (Reddick, 2004; Moon, 2005). The existing literature on e-procurement has conducted descriptive and empirical studies of e-procurement adoption (see Wyld, 2001; Moon, 2003, 2005; Reddick, 2004).

Traditional procurement is a paper-based process that often is characterized by fragmented purchasing, off-contract buying and lack of control over expenditures (Mitchell, 2000; Krysiak, Tucker, Spitzer, & Holland, 2004). The paper-based procurement process has managers spending most of their time chasing paperwork rather than managing their supplier base or negotiating better prices (Moon, 2003).

## ONLINE BIDDING, DIGITAL SIGNATURES, AND REVERSE AUCTIONS

For public sector organizations, the first step to online procurement is to send out solicitations and receive bids for government contracts electronically (Holmes, 2001). Requests for bids or proposals can be placed on the Web or e-mailed to contractors, eliminating the need for traditional postal waiting periods—which often take up to 4 weeks—between the announcement of a contract and the acceptance of bids. Bidders can be notified immediately by e-mail. Other common vehicles for e-procurement are e-catalogs, procurement cards and e-marketplace (Krysiak et al., 2004). There are fully integrated e-procurement systems developed by various commercial vendors (SAP, Oracle, etc.). Web-enabling Enterprise Resource Planning (ERP) is another electronic technology that governments can use and is discussed in the future trends section of this article (Reddick, 2004).

Technologies such as digital signatures are becoming well established, making it safer to procure over the Internet. A digital signature is an electronic means of signing electronic documents that provides sender authentication using public-key encryption (Laudon & Laudon, 2001). Digital signatures support e-procurement by facilitating online financial and document transactions. The authentication procedure of digital signatures includes: (1) combining private keys and specific documents; and (2) computing the composite (key + document) and generating a unique number—the digital signature (Moon, 2003).

Online reverse auctions (descending prices) present a major departure from the standard public procurement process, in which contracts are awarded on the basis of sealed envelopes and companies have only one chance to make a winning bid (Soudry, 2004). In a reverse auction, the buyer sets up an auction to receive bids from suppliers (Wyld, 2001). In online auctions, bidders typically make several submissions over the course of an hour or two. A reverse auction is a supply-aggregating event that lowers the price of goods for a buyer. Through a pre-qualification process, all issues are generally settled between the procuring organization and potential suppliers before the auction. Usually, the only remaining issue to be settled is the price.

Some of the chief benefits noted in the literature of reverse auctions are: (1) increased numbers of potential suppliers; (2) reduced procurement cycle times; (3) lowered purchase prices; and (4) increased transparency (Wyld, 2002; Soudry, 2004). One drawback of online auctions is that they remain focused on the market of buying indirect goods or Operating, Resources and Management (ORM). Another drawback is that the entire process works against some of the key value principles of procurement and new public management (MacManus, 2002). Furthermore, it is difficult to predict prices, and each day may bring a completely different set of bid responses. In addition, because of the emphasis of an auction on price alone, it makes it difficult for suppliers to maintain any close relationship with the buyer. Issues concerning collaborative design, quality assurance levels and delivery dependability are often much more important in the procurement of direct goods or Maintenance, Repair, and Operations (MRO) than price alone (Neef, 2001).

## BENEFITS AND DRAWBACKS OF E-PROCUREMENT

Several benefits are achieved through the implementation of e-procurement practices. A government can lower its administrative costs associated with procurement by reducing the number of people and time associated with the process. For instance, in a typical manual system, users would first have to find a supplier, obtain the appropriate paper catalog, select the item, and seek and obtain management approval. After review and approval of the requisition by the procurement professional, a purchase order would be faxed to the supplier. This fax would be followed up with a phone call to verify receipt, and then copies would be sent to shipping and receiving, accounting and finance, and department managers. This paper-based system is sequential, prone to errors, encourages the carrying of excess inventory and makes enterprise-wide integration very difficult. With e-procurement, the process is significantly more efficient. Employees can access approved vendor catalogs from their personal computers, identify and compare needed items, and order them. Product availability and delivery information is readily accessible, and payments can be made electronically. Rule-based software can either provide automatic approval for routine orders or route the request to an available manager for approval (Gansler, Lucyshyn, & Ross, 2003).

An example of the public sector procurement process eliminating manual processes can be seen through the World Bank's use of e-procurement for the selection of consultants. This is said to achieve efficiency, transparency, service quality and compliance in the consultant selection process required by the World Bank (Leipold, Klemow, Holloway, & Vaidya, 2004). The Republic of Korea adopted its Government e-Procurement Systems (GePS), which is a Internet portal site providing information on public procurement and an application service

provider that will reduce paperwork and red tape, expand the range of commodity selection and standardize services (Seong & Lee, 2004). Finally, the European Commission (EC), as a means to allocate contracts in a more efficient and transparent way, adopted specific rules governing the use of reverse auctions (Soudry, 2004).

E-procurement can also significantly reduce the price of materials and supplies. Buyers can more easily identify the best value when they have access to more suppliers. This not only results in increased competition, but new visibility also creates opportunities that were previously unavailable for small businesses. Using online reverse auctions, buyers and sellers can quickly exchange information and bids, which often results in significant cost savings. Digitized transactions provide a complete, instantaneous and far more accurate audit trail that allows management to track the status of orders and identify and fix problems sooner. This data collection also allows organizations to monitor off-contract purchasing, a significant target for cost-cutting improvements. These maverick purchases are out of compliance with the organization's volume purchase agreements (Gansler, Lucyshyn, & Ross, 2003).

The use of the Internet to deliver all government services is a significant barrier because of the digital divide. Small business owners feel that they are disadvantaged in the e-procurement process because of their lack of technical expertise and education on the government's multiple procurement Web sites (GAO, 2001). MacManus (2002) makes the argument that one of the most serious inclusive issues facing government procurement officers today is the minority business owner's digital divide. As many large-sized businesses use the Internet, minority entrepreneurs (many small business owners) may struggle more to harness the power of IT and e-procurement because of lack of resources and requisite skills.

The drawbacks and benefits of e-procurement can be summarized (Neef, 2001; Wyld, 2001; Moon, 2003; Reddick, 2004). The benefits of e-procurement generally cited in the literature include the following: (1) lowered transaction costs; (2) faster ordering; (3) greater vendor choice; (4) more efficient and standardized procurement processes; (5) more control over procurement spending (e.g., less maverick buying) and employee compliance; (6) more accessible Internet alternatives for buyers; and (7) less paperwork from fewer repetitive administrative procedures.

Another study of Greek government purchasing identified benefits of e-procurement as: (1) improved control over vendor relationships; (2) accurate fulfillment of processes; (3) improved effectiveness of the purchasing process; (4) achievement of higher service levels; (5) reduced prices from key suppliers; (6) reduced inventory carrying costs; (7) and reduction of order cycle time (Panayiotou et al., 2004).

The drawbacks for e-procurement can be summarized as: (1) technical complexity—privacy, security, standardization and so forth; (2) legal issues, such as Web information as a public notice, digital signatures for procurement documents; (3) method of payment for potential initial developmental costs and operating costs; 4) maintaining relationships with online vendors and application service providers; and (5) the digital divide for small and minority-owned businesses.

## MANAGEMENT CAPACITY AND E-PROCUREMENT

A committed senior leadership is critical for achieving a transformation and integration of the government's supply chain, and to overcome existing legislative, regulatory and organizational barriers (Gansler, Lucyshyn, & Ross, 2003; Reddick, 2004). As governments attempt to cut costs, they increasingly look to IT to improve their supply chains by automating and digitizing their procurement processes (Neef, 2001).

According to Neef (2001), e-procurement continues to enhance the breakdown of traditional silos and shift management's focus toward horizontal processes and the empowerment of individual employees. In the past, the purchasing process was seen as a set of separate activities and functions, controlled centrally or departmentally, often focused narrowly on silo-based incentives rather than on total cost. E-procurement systems facilitate direct or MRO procurement of materials for finished goods as part of a single, fully integrated process, extending from forecasting and planning through the entire supply chain. For indirect or ORM materials, e-procurement systems allow for a far greater level of individual empowerment as pre-approval and purchasing is handed over to individual employees.

Neef (2001) believes that part of the problem is that in most organizations, the procurement process is still seen as tactical rather than strategic, as a cost rather than a benefit to the organization. The e-procurement function for many governments is still limited to occasional and uncoordinated shopping online for office supplies. Other issues are security and trust. Unknown vendors make procurement officers hesitant to give up their cumbersome paper-based process conducted with long-time and trusted suppliers. The management issue here is how to train personnel to use online procurement tools and tretrain those workers displaced because of e-procurement (GAO, 2001).

In the traditional bureaucratic model, public managers focus on internal productive efficiency, functional rationality and departmentalization, hierarchical control

and rule-based management. In contrast, under e-procurement, public managers shift from emphasizing producer concerns, such as cost efficiency, to focusing on user satisfaction and control, flexibility in service delivery and network management with internal and external parties. The new paradigm stresses innovation, organizational learning and entrepreneurship so government can continue to reinvent itself (Moon, 2005).

Moon (2003) argues that moving toward e-procurement from traditional paper-based processes also brings great challenges to procurement officers. They need new technical and managerial skills, such as managing electronic catalogs; building relationships with online vendors and independent Application Service Providers (ASP) (or portal site providers); and developing strategic team-based purchasing with other purchasing entities. To sustain the development of e-procurement, governments must provide appropriate technical training and assistance to procurement officers and develop closer working relationships with vendors and various government buyers (Neef, 2001).

E-procurement problems lie with a government's inability to muster the political and managerial will to mandate the use of e-procurement by both agencies and suppliers, and its unwillingness to manage institutional change as procurement systems are converted from a manual process to an electronic one (Newcombe, 2001). Because of the current fiscal problems that many governments face, some have proposed an enterprise-wide solution to bundle costs.

## FUTURE TRENDS

One solution and future trend to the current slow down in development of e-procurement is ERP, which has become the new catchword for e-procurement reform. ERP brings together the business practices of an organization's accounting, budget, payroll and procurement functions (Laudon & Laudon, 2001). ERP focuses on tying together IT systems, thus gaining economies of scale through the coordinating purchasing of interoperable management systems.

By making e-procurement part of the ERP package, purchasing departments have found that funding technology is no longer something they have to shoulder on their own (NECCC, 2000). Instead, it is an enterprise issue that requires state funding, usually in the form of money taken from general appropriations. By designing an enterprise-wide solution that leverages the existing electronic systems that govern a broad range of agency activities, an advanced e-procurement solution could be realized that saves money, improves vendor satisfaction and is sustainable (Newcombe, 2001).

## CONCLUSION

E-procurement in the public sector will radically transform the traditional paper-based procurement process. The Internet and procurement allow governments to conduct online bidding and reverse auctions, and replace paper-based signatures with digital ones. Some of the benefits of e-procurement are reduction of agency costs and more efficient purchasing processes. Some of the costs of e-procurement are the digital divide for small businesses and the legal ramifications of digital signatures. Strong leadership and management is the most important factor for successful e-procurement development. ERP is a future trend of e-procurement, because it brings together the different functions of government, including e-procurement, making it a critical component of government in a digital world.

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## KEY TERMS

**Digital Divide:** Large differences in Internet access and e-commerce access among income, ethnic and age groups. Related to e-procurement, since many minority and small businesses may not have access to the Internet.

**Digital Signatures:** A digital code that can be attached to an electronically transmitted message to uniquely identify its content and the sender.

**Enterprise Resource Planning (ERP):** Government-wide information systems that integrate key government processes so information can flow freely between different parts of the public organization.

**Online Bidding:** Being able to bid for products or services over the Internet rather than using the traditional paper-based procurement process.

**Privacy:** Includes both the claim that certain information should not be collected from the Internet at all by governments and the claims of individuals to control the use of whatever information is collected about them.

**Reverse Auctions:** Sellers bid on a price over the Internet to provide products or services; winning bid is the lowest-price provider.

**Security:** Educates and trains users, keeps management aware of security threats and breakdowns, and maintains the tools chosen to implement security on a government Web site.

# A Government Insurer Enters the Brave New World

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## INTRODUCTION

Governments provide a wide range of services, and the digital economy provides both threats and opportunities in this sector. The Transport Accident Commission (TAC) is a compulsory, government owned and operated insurance scheme for third-party, no-fault liability insurance for transport accident victims, operated in Victoria, Australia.

E-business has now been widely used in all sectors from small business (Loane, McNaughton, & Bell, 2004) to emerging economies (Li & Chang, 2004), and in very different industry sectors (Cagno, Di Giulio, & Trucco, 2004; Golden, Hughes, & Gallagher, 2003). Major steps forward and applications have occurred in retailing (Leonard & Cronan, 2003; Mackay, Altmann, & McMichael, 2003; Starr, 2003).

Applications need to be highly customized as the business-to-consumer (B2C) and business-to-business (B2B) environments are very different, and requirements of industries such as retailing and mining, and indeed government, differ substantially (Carter, 2003; He & Lung, 2002; Rotondaro, 2002). Government provides a particularly different environment for e-business applications because government services are often delivered in monopoly circumstances, with no real profit motive behind them.

At the height of the technology boom in October 1999, Tony Marxsen joined the TAC as head of IT to develop a new IT outsourcing contract for the organization as the current 5-year contract was due to end in July 2000.

He quickly realized that the TAC IT systems were out of date, lacked IT process integration, and were constraining improvement in business processes, and that no significant investments had been made for some time. Renewing or redesigning the outsourcing contract, the basis for which he had been employed, would only be a short-term solution.

The problem was that the cost of new infrastructure would be high, and return on technology investment would mainly be realized from redesigned business processes enabled by the new technology. Tony wanted to propose a business transformation, with process changes as well as significant investment in IT infrastructure. Together, these would take the TAC from 1970s technology into the 21st century. The problem was that

*their (investments in such transformation) payoffs are not easily and quickly achieved. Their value does not come from installing the technology; it comes from changing both operating and management processes—perhaps operating and managing cultures too.* (Ross & Beath, 2002, p. 53)

Tony knew he would have to win the support of the board and senior management, but he could not immediately give them a concrete business case for the investment. He also knew that any infrastructure investment had to be linked with a major process-improvement initiative from the start to avoid the double investment of building new applications to support old processes, and then undertaking major modifications or even replacement when the need for improvement became obvious to the board and management team. He compared investing in IT infrastructure to rewiring and replumbing your house:

*as far as visitors are concerned, there's no visible difference, everything's behind the walls, but as the owner you get the benefits of things like cheaper electricity and water bills because of efficiencies in the new redesigned systems. The problem is convincing people that they will get these results in the future, but that they need to hand over the money now, when there's no hard evidence for the benefits they'll get, just a bunch of assumptions and no guarantees. It's a big ask for any Board.* (Marxsen, personal communication, September 4, 2003)

Tony knew that the first hurdle he would have to overcome would be getting the board to agree to give him the opportunity to put together a team to develop a business case for the board's further consideration.

## BACKGROUND

The economic and social costs associated with road accidents have made the issue of road safety a major concern and cost for the community.

In 1986, the Victorian Parliament passed the Transport Accident Act 1986, establishing the TAC from January 1, 1987. The purpose of the act was to establish a compensation scheme "in respect of persons who are injured or die as a result of transport accidents," as well as promoting road safety in Victoria and improving Victoria's trauma system (Marxsen, personal communication, September 4, 2003).

Operating as a commercial insurer, the TAC is funded by payments made by Victorian motorists when they register their vehicles each year, and by premiums charged to managers of tramways and railways, as well as from investment income generated on reserves. As such, the TAC operates as a state-owned enterprise of the Victorian government.

## CONCEPTUAL FRAMEWORK

Timmers (1998) specified a number of e-business models, and Rappa (2003) more recently defined nine categories for e-business models: advertising, affiliate, brokerage, community, infomediary, merchant, manufacturer, subscription, and utility. TAC is clearly a manufacturer of insurance policies and claims processing services, many of which are quite complex. Joyce and Winch (2005) provided a comprehensive conceptual framework posing that the firm's business strategy, emergent and realized, should combine with the firm's dynamic capabilities to form a business model within which the business processes and the enabling technologies should be chosen and implemented. This framework has valuable insights, which TAC learned to some extent the hard way, for it began its e-journey looking closely at the technological opportunities and then realized that it needed to step back and consider its business processes (and their reengineering) first. Then it realized that at an even higher level, future organizational strategy needed to be well formulated in order to drive the business model, and only then can process and technology choices be sensibly made in an existing organization that is mature in its life cycle and in an established industry. While technological opportunities may be a major driver in a private-sector Greenfield or start-up company or industry, in a government-owned services organization, which primarily exists to implement an act of parliament (which is very detailed in its prescriptions of what and how it must act), the board of the TAC and the e-TAC project team realized that e-business choices must be governed and constrained by a primarily top-down approach.

## TAC Business Processes and Information Systems

The TAC processes around 18,000 new compensation claims per year covering transport accidents directly caused by the driving of a car, motorcycle, bus, train, or tram. The organization pays benefits to people injured in an accident as a driver, passenger, pedestrian, motorcyclist, or cyclist.

The accountability and administrative issues surrounding claims management means that the TAC sends around 1,200 letters and 350 faxes per day, and issues around 800 checks and electronic funds transfers (EFTs) per day. On top of this, it is estimated that the organization receives around 4,000 inbound correspondence items and 550 pages of faxed items per day.

Administrative costs are around $64 million per annum, whilst claims payments made are in the order of $500 million per annum.

## A Changed IT Environment

Whilst overall the 5-year TAC contract with DMR outsourcing had been successful, with a number of financial savings, project phases delivered on time and on budget, and successful Y2K (year 2000) work amongst other things, a number of changes in the marketplace had taken place during the life of the contract.

The changed environment meant that major savings could probably be achieved if the current contract was broken into smaller parcels going forward.

However, in order to write effective tender documents for the various services that could be unbundled and outsourced, various organizational systems and processes needed to be reviewed.

## Developing the New TAC IT Strategy

A review in late 1999, in conjunction with the board and with input from the Boston Consulting Group and Deloitte, confirmed that significant changes to the organization's information-technology systems were needed to move forward. It was proposed that a new IT strategy had to be designed that would deliver the following important organizational requirements:

- Systems and infrastructure to deliver quality information for effective liability control
- Systems to support process improvements aimed at efficiency and service delivery
- Best-practice security of all information
- Active management of technology at risk

*Example 1.*

| From | To |
|---|---|
| – An enclave business operation | – A networked business operation |
| – Paper files | – Electronic files |
| – File-based claim management | – Process-based claim management |
| – Boundary security | – Information security |
| – Applications-centered IT strategy | – Environment-centered IT strategy |
| – IT for transactions and analysis | – IT for collaboration and learning |
| – IT used to automate work | – IT used to enable change and improvement |

- Purchase of IT services by competitive tender
- Cost-effective investment

In addition, the services purchased should enable the TAC to accomplish the following:

- Maintain control of the transaction at all times
- At all times have at least one suitable supply option available
- Maximize price pressure both in the purchase process and through the life of the contract
- Build in risk protection (alternatively, buy insurance)

A number of changes to the business would be required, in particular, moving from and to as presented in Example 1.

## The Business Case

The essential elements of the original business case for the TAC's technology strategy had remained constant since 1999, when Tony had initially presented his proposals to the board. The benefits of the new e-business strategy proposed would include improvements to the following:

- **Access:** To keep customers informed
- **Transparency:** To show clearly the basis of decisions
- **Timeliness:** To enable fast decisions and payments
- **Efficiency:** To require less paper, less time, and less errors, and enable outplaced work
- **Relationship Management:** To enable the influencing of provider markets and the management of long-term claimants
- **Brand Management:** To influence community views

The first business case analysis for the technology upgrade was presented to the board in February 2000, estimating a cost of $20 million for the program proposed, leading to anticipated savings in the range of $10 million per year. Some benefits were expected to be realized in year 2 of the program (i.e., 2001/2002), but overall, the payback was estimated to be seen in 4 years, using the assumption that the mainframe would be retained and that avoided costs would be included in the benefits.

On the basis of the case presented, the board in principle approved the proposed program of work, which included investment in basic infrastructure activities that were expected to quickly realize financial and other benefits for the business.

The board also endorsed management's proposal to move from a fully bundled IT-services contract to multiple purchase contracts for different services based on the premise that breaking up the outsourcing contract would enable the capture of cost and service benefits from what had become a highly competitive market for the supply of IT services. Management projected that this new approach alone would yield net annual savings of around $3 million when compared to the previous contract.

## Getting Started

In early 2000, the major technology upgrade started, with three highly interlinked and interdependent streams of activity in the project:

1. Replacement of the previous purchase agreement for the supply of IT services (for which the current agreement was coming to an end)
2. Replacement of obsolete mainframe systems and reduction of the TAC's reliance on paper documents
3. Selection of high-priority business-improvement projects to address key TAC goals of liability control, client satisfaction, and operational efficiency

While efficiency gains through process improvement were expected to return the greatest benefits in the long run, the major costs would be incurred in technology

replacement in the short term, although neither type of work could feasibly proceed in the absence of the other.

## Unbundling the Current Contract

In order to break up the current bundle of services, IT services were segmented by technical skills and management processes as it was considered that this was the best approach for efficient and effective service delivery.

The services ranged from commodity type (distributed and application platforms) to potentially competitive (application development) and noncommodity types (application support and security).

## The Future of the Mainframe

The 700 programs with 2.5 million lines of handcrafted code on the mainframe with no data-archiving facility meant that the existing mainframe system had both high development and operating costs. Examples are as follows:

- The Y2K program cost close to $2 million, and simple code-table changes typically cost $10,000.
- The system required the support of a new claim form in 1999, costing around $400,000 to implement. Most of the costs being incurred were to interface the new system to the mainframe.
- Even relatively minor changes to the TAC's core payment system are expensive. For example, the move by the Department of Human Services (DHS) to a new injury coding system (ICD 10) is expected to result in $250,000 in programming costs for the TAC system to align.

## Early Initiatives

Complete mainframe exit became the only viable strategy, representing the major capital cost of the e-commerce strategy, estimated at around $25 million.

A number of quick-win opportunities were identified and implemented during the early stages of the project. These initiatives were mainly internal or business to business, and were designed to introduce staff to the idea of change in a nonthreatening way.

Projects implemented included establishing Lotus Notes team rooms for the posting of meeting agendas (whilst people printed copies off for themselves, they no longer had to be filed subsequently), developing electronic leave forms, replacing the generation of checks with EFT, and outsourcing the printing of remittance advice and putting around 3 million pages of operational management reports onto Lotus Notes attached as PDF (Portable Document Format) files.

## Care Online

A significant early project was the introduction of Care Online, which involved the reengineering of the administration processes associated with managing the TAC's relationships with attendant-care service providers such that the majority of the administration work associated with this group is now transacted electronically.

## Management and Control

For the first 9 months of implementation, Project e-ch@nge operated relatively separately from the business. The executive team was briefed weekly on issues and developments, and the board received a number of presentations and reports.

Then, from early 2001, the work program was integrated into the broader TAC organizational operations, and a more traditional control framework was established, which included the following:

- An executive steering committee that met fortnightly
- Independent funding-control processes, and benefit-monitoring and -reporting arrangements
- Reference groups comprising a range of employees and managers for the major process-improvement projects
- A technology architecture expert group to manage technology risk
- A security expert group to manage the required upgrade of security controls and practice
- Detailed project-management controls on all significant IT development projects

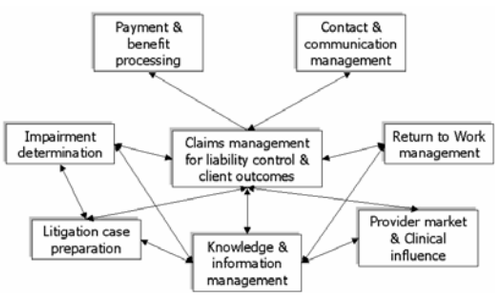
## Communicating Change

One of the most time-consuming aspects of the Project e-ch@nge implementation has been the communication activities associated with project ownership and development, both internally and externally.

Internally, management has to address board membership changes during the development and life of the project; it was faced with implementing a reeducation program to bring the new board up to speed with the very significant investment being undertaken.

Externally, the variety of different service providers and their differing market concentration levels and modes of operation (especially private vs. public) have meant that solutions have had to be tailored for each service-provider group and, as such, negotiated with each provider group. The highest level of security of the systems developed has been critical in achieving buy-in, espe-

*Figure 1. TAC key business-process groups*




cially where shared transaction data and client personal information is at stake.

## Risk Management

The TAC deliberately chose not to use leading-edge technology or techniques, except perhaps for the use of secure e-mail using digital signatures. The lack of an integrated repository had been identified early on as a key cause of failure for other companies attempting to implement e-commerce strategies, so an integrated document-management and customer relationship management (CRM) system as part of the back-office systems was therefore seen as essential to support the TAC's IT strategy implementation. Several risks to the successful implementation of the new IT strategy were identified, and strategies were developed to manage those.

## The TAC Business Processes

The TAC has broadly characterized its systems and processes into interrelated key business-process groups.

The grouping in Figure 1 was done as part of a review of existing and future IT priorities. Considerable work was involved in defining the groups and the processes involved.

## Business-Improvement Projects

The replacement of obsolete technology provided the opportunity to build new systems around improved business processes rather than automating existing processes.

An analysis of each core process uncovered a number of issues, as summarized in Table 1.

*Table 1. TAC core process issues*

| Core Process | Issues |
|---|---|
| **Payment and benefit processing** | – Time consuming and costly to change the business rules<br>– Lack of system flexibility results in a high proportion of held payments requiring manual intervention |
| **Contact and communication management** | – No tracking of what communication is coming in and out<br>– Ineffective process for determining who should respond to communications<br>– Inconsistent approaches to communication responses |
| **Impairment determination** | – Client is disempowered<br>– Complex assessment process<br>– Most of the process steps are external to TAC<br>– Subject to scrutiny and litigation as the impairment score is the gateway to common law<br>– VWA has same interests |
| **Litigation case preparation** | – Process has high document-generation and -management content<br>– Process is highly influenced by external events and triggers |
| **Return to work** | – Lots of process steps, few systems<br>– Reactive triggers to the process |
| **Human-resources (HR) management** | – Limited integration between performance management and business performance<br>– Training and development focused around induction on mainframe systems are expensive |
| **Claims management for liability control and client outcomes** | – Noise in the process<br>– Service culture and outcome focus |
| **Knowledge and information management** | – Data integrity is poor<br>– Data structure adds to assembly and analysis costs<br>– Tools and skills limit access to data<br>– Very little unstructured knowledge is captured<br>– No data archiving |
| **Provider market and clinical influence** | – TAC data gathering is time consuming<br>– Limited flexibility in views of TAC data<br>– No connection to claims-management knowledge (data) |

## Benefits of Process Improvement

Experience from early projects (such as care online, e-admin) backed by extensive analysis showed that significant potential benefits would be available if the TAC applied a systematic approach to the improvement of its core business processes. These benefits included improvements against all TAC business objectives, including estimated operational efficiency savings sufficient in themselves to pay for the total cost of the combined technology replacement and process-improvement program over a period of some years.

For example, instead of the traditional file-based claims-management system, the TAC now has the chance to look at, say, surgery processes in such a way as to enable an analysis of how the organization manages surgery risk, benchmarks against surgery best practice and costs, and provides the input and feedback needed to improve processes. The best-practice process information developed will also be used as an input to managing costs more effectively for individual claim files.

To decide which order the processes should be addressed in, the business processes had to be assessed to identify which ones could be made more effective for the best returns according to the size of the opportunity identified, the potential administration and claims savings, the potential gains in customer satisfaction, and estimates of implementation costs and associated risks.

Prioritizing Business-Process Improvement

In late 2000, the TAC's key business processes were put forward for review by the executive team. For each opportunity, three sets of information were required to define relative priority.

- **The Context:** The size of the opportunity.
  - The administration cost per annum
  - The benefits and payments per annum
  - The liabilities and client segments affected
  - The number of TAC personnel involved in the process
  - The issues with the current process
- **The Value Assessment:** In terms of the administration and claims savings and any gains in client satisfaction.
  - The opportunities available
  - Desirable attributes and vision of a new approach
- **The Cost-Risk Estimate:** The cost, delivery time, return risk, and the cost-time risk.
  - The prerequisites that would need to be in place to deliver this
  - The key project components that would have to be undertaken

All the processes were examined using the same approach, and this enabled management to identify the two key processes that were selected to get the ball rolling.

1. Payment and benefit processing
2. Contact and communications management

A key consideration in the selection of these two key business processes was that most of the other seven key processes, including high-priority ones such as liability control and legal case management, could not proceed without the infrastructure that these two would deliver, especially e-file (the main thrust of reducing the organization's reliance on paper documents, which is described in the section on contact and communication management) and improved payment systems.

## Payment and Benefit Processing

The existing payment- and benefit-processing processes were time consuming and costly, with people employed to manually check that invoices for treatment received and recorded on the mainframe system tallied with approved treatment plans or information held on paper file. Each year, about 800,000 transactions are manually checked. To manage mismatches between individual claim profiles and the way the system operated meant that the business rules needed to be changed, which was very costly.

To move forward, management saw significant administration efficiency gains could be made if the rework associated with payments on hold could be eliminated whilst retaining control over claims payments.

The Vision for Payment and Benefits

The vision for the new process was agreed as redesigning processes and information capture to do the following:

- Pay the right amount for the right things the first time
- Provide prompt feedback to clients and providers
- Separate processing from decision making
- Capture and validate data at the source
- Use people only where true judgment is needed

This would be likely to impact claimants regarding the following aspects:

- Initial eligibility
- Income benefits and RTW programs
- Treatment and support services for clients
- Assessments and referrals to suppliers
- Lump-sum payments and settlements

The TAC needed processes that reflected the market concentration of the service providers, the rules for each type of provider or benefit, and the volume of transactions. From a systems perspective, the business rules needed to be separated from the paying engine. Current payment processes vary depending on supplier or provider type. The most complex group to work with is hospitals because of their funding rules.

## Public Hospitals

There are around 200 public hospitals in Victoria, and TAC treatment undertaken at these hospitals includes outpatient specialist services and inpatient (case mix) services.

## A New Claim Intake Process

A new claim intake management approach will enable much more efficient and effective claims processing. Analysis and action research highlighted that although the existing claim intake process was "one size fits all," there were significant differences in the needs of particular client groups at this early stage of their claims, and furthermore there was recognition that the TAC required different amounts and types of information from clients.

A new telephone-based intake process will be implemented to improve service delivery, risk identification, and efficiency. Rather than completing the 16-page form, the client's first experience will be a conversation with a TAC staff member. During this conversation, the client will be provided with assistance and information regarding their entitlements, and the TAC will be able to gather the information it requires. Further efficiencies will come from the following:

- Screening out many of the claims (currently 2,000 each year) for which the TAC makes no payment at all
- Collecting a limited set of mandatory information from clients seeking coverage for a single ambulance trip and brief treatment in a hospital emergency department (between 4,000 and 5,000 claims a year)
- Gathering only relevant information for other claims; for example, whilst only 20% of clients are eligible for income benefits, many more complete the detailed questions on the claim form regarding their income and dependants. This data was entered into TAC systems even though they are not required.

## Contact and Communications Management

In 2001, the TAC did not adequately track incoming and outgoing communication and could not guarantee consistent responses to calls and correspondence. Processes for determining who should respond to what communications were ineffective, with clients and providers often dealing with a range of different people before they had the information they needed.

Management saw the need for systems that would track inbound and outbound communication, and that efficiency benefits would be realized if new processes could get communications to the right person the first time.

## E-File

Initiatives to reduce the TAC's dependence on paper documents would be centered on the integration of a document-management system and a CRM system into a new system, know as e-file.

The concept developed by the TAC would have to bring together the electronic and paper-based information so that there could be a single point of access to any particular claim file: all communication, documentation, and transaction history.

The e-file system uses a Domino database to enable document attachments and image files to be stored as well as text notes. For every document on the document system, an entry is also made into a DB2 database, which holds the first 256 characters of each text and all the indexes used to categorize the item. A Java interface, accessed by a browser, presents the user with a summary of the claim using the 256 characters from each entry. The most recent 20 items are displayed automatically, and the user accesses earlier items by clicking "next 20 items" in much the same way as an Internet search engine operates.

## Rolling Out E-File

Changeover to e-file successfully took place on March 12, 2002, when a major part of the mainframe system was shut down and mainframe text was copied across into the new e-file system. Outgoing correspondence, phone calls, and other documents are no longer put on the paper file, but are stored in the new system for immediate access.

In order that the transition from the old system to the new system ran as smoothly as possible, 650 people were trained for 2 hours each during the 2 weeks prior to the implementation date.

TAC staff has responded positively to the new system, and though much more work will be required to back-

capture the existing paper documents, this first stage was a significant milestone for the overall transformation.

## FUTURE TRENDS AND CONCLUSION

Following the completion of the transfer of documentation into e-file and the back-capture of paper documents for active claims, the next challenge was implementing projects associated with the process improvement of the TAC payment system.

The digitalization of this important government authority has thus begun with the finishing of old mainframe-based legacy systems, the creation of an e-file system for going forward, and hence a new technology platform that is expected to improve outcomes for all stakeholders.

Lessons learned included first framing the initiative based on considerations of the organization's future strategy. Furthermore, it was clearly the case that legacy systems had brought a lot of inertia to business processes over the past years. So, the big opportunity was to understand what is possible through enabling e-technologies, and to then translate strategy into business processes that make the most effective use of such e-technologies. This can be considered as a case of trying to fit top-down strategic considerations to bottom-up technological capabilities. In addition, careful consideration of where the most effective "bang for the buck" is is always warranted, and intuition proved to be wrong on some occasions about whether there was most scope for business improvement in B2B or B2C spaces; hence, careful analysis is clearly worthwhile before proceeding.

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## KEY TERMS

**Business Transformation:** Significant change in the organization's business model, including its enabling technologies as required.

**E-Business Models:** Types of business forms enabled by e-business, such as affiliate, brokerage, community, infomediary, and merchant.

**IT Process Integration:** Digital connectivity of data sets and information availability across software and database applications within or across collaborating organizations.

**IT Strategy:** An overall direction of investments in IT that fits the business and operating processes and guides IT investments and characteristics to achieve technical capabilities and business goals.

# Historical and Contemporary Perspectives of Media and Citizenship

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## INTRODUCTION

Citizenship has long been connected to communication media. Popular media have been both the relay points between the governing and the governed for purposes of developing nations and citizen identities as well as the places for articulating discontent with the unjust, illegitimate, or unpopular uses of public authority. Yet, one often struggles to find reference to the significance of media to the formation of citizenship practices and identities, particularly in mainstream political science literature. It has been largely in the field of cultural history, through the work of authors such as Benedict Anderson (1991) and Michael Schudson (1994), that a conception of citizenship is linked explicitly to the technologies and institutions of media communication.

## BACKGROUND: HISTORICAL-NORMATIVE APPROACHES TO MEDIA AND CITIZENSHIP

Modern forms of governance rest upon mediated interaction rather than upon direct speech and face-to-face communication, due to the size, complexity, and diversity of modern nation-states. This was observed by classical philosophers of modernity such as Immanuel Kant and G.W.F. Hegel, who recognized the relationship between the means of expression of ideas and the popular imaginary. Kant defined the public use of reason as "that use which anyone may make of it as a man of learning addressing the entire reading public" (Kant, 1971, p. 55), while Hegel described "reading the morning paper [as] a kind of realistic morning prayer" (quoted in Donald, 1998, p. 219). The concept of citizenship has been important to media studies, particularly since the early 1990s, where it provided a way of thinking about media outside of the market-vs.-state dichotomy. Using T. H. Marshall's (1992) historical typology of civil, political, and social citizenship, Golding and Murdock (1989) proposed that communication policies that guaranteed citizenship rights would:

1. Maximize access to information, particularly in areas most relevant to the rights of citizens;
2. Provide all sections of the community with the broadest possible range of information, interpretation, and debate on issues; and
3. Allow people from all sections of society to recognize themselves in the representations offered in communication media and to be able to contribute to the development and shaping of these representations.

The necessary conditions for communication and information systems to achieve such goals are maximum possible diversity of provision, mechanisms for user feedback and participation, and universal access to services, regardless of income, geographical location, or social situation.

The relationship between media and citizenship has been discussed in three key approaches. The first is the liberal media theory and the idea of the media as a Fourth Estate. This theory has its origins in the American and French Revolutions of the late 18th century and sees the role of the media in modern liberal-democratic societies as the guardians of the rights and liberties of citizens in the face of unaccountable or irresponsible exercises of institutional power. In order to do this, the media must be free from government control or domination, and journalists must be willing to assert their roles as defenders of the public interest in the face of challenges from the executive, parliamentary, or judicial estates of government (Schultz, 1998; Siebert, 1963).

A recurring difficulty for liberal or Fourth Estate media theories in relation to citizenship is that of reconciling the formal equality of senders and receivers in the communication marketplace with substantive inequalities in access to material resources to influence public opinion due to the concentration of ownership of the most influential media among a diminishing number of powerful corporate interests. In other words, since liberal societies are also capitalist societies, the dynamics of capitalism as they impact upon the media (including concentration of ownership and control, class-based and other social inequali-

ties, commodification, and the intertwining of economic and political power) serve to undermine the capacity of commercial media to realize the citizenship principles associated with the ideals of the Fourth Estate (Curran, 1991). Schultz has referred to the difficulty of maintaining the watchdog role of journalism, in which it is increasingly "bound by the paradox of holding its head in politics while its feet are grounded in commerce" (Schultz, 1998, p. 45).

The second approach to media and citizenship is the critical media theory and its understanding of the role of the media in the public sphere. Critical media theorists also believe in the emancipatory possibilities of media to realize full citizenship but are concerned, as noted previously, with the degree to which media institutions are enmeshed within wider structures of political and economic power. The argument was developed most forcefully in Jürgen Habermas' (1977) historical-normative analysis of the public sphere. The public sphere emerged in early 18th-century Western Europe as a site independent of the church or the state. Habermas (1977) depicted this as an ideal forum in which media would be read and discussed among groups, and its wider ramifications would be debated and acted upon. While such a bourgeois public sphere was central to the rise of capitalism and the weakening of aristocratic and royal authority, its decline in the 19th and 20th centuries arose from trends also linked to capitalism, including the concentration of corporate control over media industries, the rise of advertising and public relations, and the growing role of the state in communication management.

While public sphere media theories often have incorporated a tragic (Dahlgren, 1995; Garnham, 1990) account of the relationship of media to citizenship in liberal-capitalist societies, they also have drawn attention to the positive role that the state can play in fostering citizen identities. Rather than seeing the state as the would-be enemy of personal freedoms and citizens' rights, as liberal media theory tends to do, public sphere theories draw attention to the positive and enabling roles that the state can play in fostering access, diversity, pluralism, and participation, either through media regulation or through directly funding public service or community-based media. Garnham (1990) has argued that because public service broadcasting operates according to a political rather than a purely economic logic, it is best placed to develop elements of a contemporary public sphere, as it can provide opportunities for a public dialogue to occur that incorporates the widest diversity of ideas and opinions.

A third, quite distinctive understanding of the media-citizenship relationship was developed by John Hartley (1996, 1999) in his analysis of media's role in cultural citizenship and do-it-yourself (DIY) citizenship. Hartley (1996, 1999) proposes that popular culture, particularly, journalism, develops an understanding of modern forms of political citizenship among its consumers, since media are the relay points between the institutions of authority (governmental, educational, and cultural institutions) and the broader population, who is increasingly constituted of readers, or users of media, as levels of literacy grow. Rejecting both a tragic account of the relationship between media and citizenship in liberal-capitalist societies and a distinction between quality and popular media (i.e., public service and commercial media), Hartley (1996, 1999) proposes that what media do best is cross-demographic communication, enabling people to understand both each other and the wider communities in which they exist. As consumerism and identity politics become increasingly significant in late-modern societies, Hartley argues that we are seeing a move from mass media that cater to mass society and adherence to a national culture (what he terms *cultural citizenship*) toward what he terms *DIY-citizenship*. In this emergent form of citizenship, there has been an increasing blurring of the lines between media producers and consumers due both to audience fragmentation in multi-channel media environments and to the self-production of media through new digital technologies.

## BARRIERS TO MEDIA CITIZENSHIP THROUGH THE INTERNET

Although the Internet as a form of communication media offers considerable potential to overcome barriers to full citizenship, significant obstacles remain, nonetheless. Moreover, taking a sociotechnical rather than a purely technology-based approach to the medium, it is apparent that many of these barriers are social, political, and economic in nature, and cannot be overridden by purely technical means. History also has demonstrated that there can be a lag of up to 50 years between the potential of a new technology becoming apparent and institutional and organizational changes that enable the potential of that new technology to be fully realized (David, 1999).

Early accounts of the democratic potential of the Internet clearly understated the capacity for corporate power to undercut the democratizing and egalitarian potential of new media. While much of the focus of Net activism of the 1990s was upon preventing governments from controlling Internet content, it became apparent that companies such as Microsoft could establish virtual monopolies over the provision of office-based software to the detriment of competition and innovation in the new media environment. Moreover, the extension of existing intellectual property regimes into the digital domain and the globalization of these regimes through international trade agreements has threatened the public-good elements of networked online information (Perelman, 2002;

Vaidhyanathan, 2001). In response, legal experts, Internet activists, and others have collaborated around the development of alternative Creative Commons licences, which have the potential to make online resources freely available in ways that retain the potential to enhance the rights, communication capabilities, and creative capacities of the global Internet-using community (Fitzgerald & Fitzgerald, 2004; Lessig, 2004).

Claims about a digitally empowered online citizenry also come up against the realities of the digital divide. While there has been dramatic expansion in the number of Internet users in some developing countries such as China, India, and the Middle East, it remains the case that the global divide between information haves and have-nots is large and perhaps growing. People in high-income countries are estimated to be almost 70 times as likely to have a personal computer as people in low-income countries (World Bank, 2004). Pippa Norris (2001) identified a strong correlation between Internet use and a country's level of economic development but also identified levels of education, social capital formation, and political democratization as critical factors in widespread adoption of online media. Even within those countries with relatively high levels of Internet access, there is a significant number of people without online connections who risk being disenfranchised by wholesale moves toward electronic government and online democracy (Margolis & Resnick, 2000). It is also apparent that having a computer and a network connection is not enough; the capacity to use online media to effect political change is shaped strongly by information technology literacy, access to cultural capital, and the ability to speak the dominant discourse, which, in turn, is shaped by factors that generate other forms of social inequality, such as class, gender, and race (Papacharissi, 2002).

## FUTURE TRENDS: THE INTERNET AND MEDIA CITIZENSHIP

On the basis of all of the approaches to media and citizenship discussed previously—media as Fourth Estate, media as public sphere, media as site for cultural/DIY citizenship—the Internet has been seen as offering great potential for enhancing the rights and communicative capacities of citizens. Because the Internet was popularized in the early 1990s, a time that coincided with the fall of one-party communist states in Russia and Eastern Europe, it was seen by some as a technology of freedom and a harbinger of new opportunities to realize freedom of speech worldwide, unencumbered by state controls. The Internet was a communication medium capable of realizing the ambition to align individual self-interest with the general good (Godwin, 1998).

The Internet has also promoted an expansion of the public sphere (Papacharissi, 2002). Its development as a globally networked technology has enabled a much wider range of information and opinions to be made available to users, offering the scope for individual citizens to respond to and question official information sources as well as the capacity to publish and to distribute their own opinions on a potentially global communication medium. The Internet has been seen as having the potential to broaden and deepen democratic participation in the following ways:

1. The scope for horizontal or peer-to-peer communication as distinct from vertical or top-down communication
2. The capacity for users to access, share, and verify information from a wide range of global sources
3. The lack of governmental controls over the Internet as a global communication medium as compared to more territorially based media
4. The ability to form virtual communities, or online communities of interest, that are unconstrained by geography
5. The capacity to disseminate, debate, and deliberate on current issues and to challenge professional and official positions
6. The potential for political disintermediation, or communication that is not filtered by political organizations, spin doctors, or the established news media

Moreover, by the nature of its transnational reach and its combination of one-to-one, one-to-many, and many-to-many modes of communication, the Internet enables the formation of communities of interest, or virtual communities. It is argued that the Internet simultaneously can transcend the limits of geographic space and, at the same time, be more local and community-based than mass media. The Internet has been central to organized global political activism in the early 21st century, ranging from campaigns against the World Trade Organization in 1999 (the so-called "Battle of Seattle"), campaigns against global poverty or child labor, and the development of alternative forms of DIY alternative online publishing, such as the global Indymedia sites (Bennett, 2003; Kidd, 2003). Paul Kingsnorth (2003), a leading analyst of these new global political movements, has argued:

*Internet activism ... is democratic, non-hierarchical and entirely in keeping with the global nature and principles of the movement. ... Ironically, the Internet, engine of financial and corporate globalisation, had*

*become the engine, too, of the globalisation of resistance.* (Kingsnorth, 2003, pp. 75-76)

The networked, interactive structure of the Internet, combined with the relative ease and low cost of producing digital content and publishing online, also has been seen as democratizing access to the means of communication. It is argued that the Internet breaks down the traditional producer/consumer divide of mass print and broadcast media and the transition from media consumer to what has been termed the *prod-user* of media (Bruns, 2005). There has been an important intersection here between the open source software movement, which promotes collaborative software development through ideas sharing among diverse user communities and the philosophy of open publishing. Open publishing encourages not only online publishing from a wide range of sources, thus bypassing the traditional gate-keeping protocols of mainstream news journalism, but also collaborative editing (Arnison, 2002; Lessig, 2001; Rennie, 2005). Such arguments draw upon a common set of understandings about the empowering nature of information that is shared and the greater capacity to realize the fruits of creativity, if it is accessed from a diverse range of sources through open, decentralized networks rather than closed, hierarchical, organizational structures.

## CONCLUSION

Understanding different historical-normative perspectives on the relationship between media and citizenship provides valuable insights into the potential global impact of the Internet today. Failure to recognize this can lead to assessments of the impact of disruptive technologies such as the Internet that either are overly optimistic or unduly pessimistic.

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## KEY TERMS

**Citizenship:** A status that individuals have within a community, such as a nation-state, that is a right of birth or is granted by the state, which guarantees particular rights and entitlements (e.g., the right to vote, a right to education and healthcare) to such individuals who also have obligations to the community of which they are a part.

**Digital Divide:** A term that refers to inequalities of access to networked information and communication technologies (ICTs) based upon factors such as personal income, race, ethnicity, or geographical location and how such inequalities of access impacted upon the life chances of individuals, as networked ICTs became increasingly central to how the economy and society operates.

**Fourth Estate:** A term used to identify a role for the media and, particularly, the news media as the watchdogs of how power and authority are used on behalf of the public. The term has its origins in France prior to the French Revolution of 1789. The other estates are the executive, the parliament, and the judiciary.

**Intellectual Property:** Original ideas, concepts, or designs that have been registered legally as copyrights, patents, or trademarks that entitle their owners to receive economic revenues in the form of royalties for the reproduction or use and which give their owners rights over the reuse or modification of these copyrighted, patented, or trademarked forms of intangible property.

**Open Source:** A term derived from software development that refers to source code that is made available to all on an open, public, and non-proprietary basis. Open source software is distributed with its source code and can be reproduced and modified freely by other users.

**Public Sphere:** A forum that is independent of the state, where uses of public authority can be debated among informed citizens and where public opinion is thus formed through rational debate. The German philosopher Jürgen Habermas, saw the media as playing this role in early modern Europe (the bourgeois public sphere). Habermas, however, was pessimistic about the impact of commercial mass media upon the possibility of maintaining such an autonomous forum.

# Hot-Spot Geoinformatics for Digital Governance

H

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## INTRODUCTION

Geoinformatic surveillance for spatial and temporal hot-spot detection and prioritization is crucial in the 21st century. A hot spot may be any unusual phenomenon, anomaly, aberration, outbreak, elevated cluster, or critical area. Government agencies require hot-spot delineation and prioritization for monitoring, etiology, management, or early warning. Responsible factors may be natural, accidental, or intentional, with relevance to both infrastructure and security.

This article describes multidisciplinary research based on novel methods for hot-spot detection and prioritization, driven by a diverse variety of case studies of interest to agencies, academia, and the private sector. These case studies concern critical societal issues, such as public health, ecosystem health, biodiversity and threats to biodiversity, emerging infectious disease, water management and conservation, carbon sources and sinks, persistent poverty, environmental justices, crop pathogens, invasive-species management, biosurveillance, biosecurity, disease biogeoinformatics, social networks, sensor networks, hospital networks and syndrome surveillance, video mining, early warning, tsunami inundation, remote sensing, and disaster management.

Our approach has involved an innovation of the popular circle-based spatial scan statistic. In particular, it employs the notion of an upper level set (ULS) and is accordingly called the upper level set scan statistic system, pointing to the next generation of sophisticated analytical and computational systems, effective for the detection of arbitrarily shaped hot spots along spatiotemporal dimensions. It also involves a novel prioritization scheme based on multiple indicators and stakeholder criteria without having to reduce indicators to a single index using Hasse diagrams and partially ordered sets. It is accordingly called the poset prioritization and ranking system (see Patil & Taillie, 2004a, 2004b).

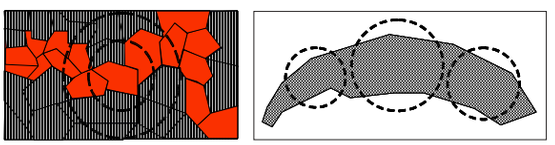
The following Web sites have additional information.

1. http://www.stat.psu.edu/hotspots/
2. http://www.stat.psu.edu/~gpp/
3. http://www.digitalgovernment.org/news/stories/2004/1104/1104_hotspots_heyman.jsp

## UPPER LEVEL SET HOT-SPOT SCAN STATISTIC SYSTEM

Patil and Taillie (2004a, 2004b) introduce an innovation of the health-area-popular circle-based spatial and spatiotemporal scan statistic. It employs the notion of an upper level set, and is accordingly called the upper level set scan statistic, pointing to a sophisticated analytical and computational system as the next generation of the present-day popular SaTScan (Kulldorff, 1997, 2001; Kulldorff & Nagarwalla, 1995; Kulldorff, Rand, Gherman, Williams, & Defrancesco, 1998; Mostashari, Kulldorff, & Miller, 2002; Waller, 2002).

*Figure 1. Limitations of circular scanning windows. (Left) An irregularly shaped cluster—perhaps a cholera outbreak along a winding river floodplain. Small circles miss much of the outbreak and large circles include many unwanted cells. (Right) Circular windows may report a single irregularly shaped cluster as a series of small clusters.*



## Background Theory of Scan Statistics

The spatial scan statistic concerns the following situation: A region $R$ of Euclidian space is tessellated or subdivided into cells, which will be denoted by the symbol $a$. Data is available in the form of a count $Y_a$ on each cell $a$. In addition, a size value $A_a$ is associated with each cell. The cell sizes $A_a$ are regarded as fixed and known, while the cell counts $Y_a$ are independent random variables. Two distributional settings are commonly studied:

- **Binomial:** The size $A_a=N_a$ is a positive integer and $Y_a$~Binomial $(N_a,p_a)$, where $p_a$ is an unknown parameter attached to cell $a$ with $0<p_a<1$.
- **Poisson:** The size $A_a$ is a positive real number and $Y_a$~Poisson $(\lambda_a A_a)$, where $\lambda_a>0$ is an unknown parameter attached to cell $a$.

Each distributional model has a simple interpretation. For the binomial, $N_a$ people reside in cell $a$ and each person contracts a certain disease independently with probability $p_a$. The cell count $Y_a$ is the number of diseased people. For the Poisson, $A_a$ is the size (e.g., area or some adjusted population size) of the cell $a$, and $Y_a$ is a realization of a Poisson process with intensity $\lambda_a$. In each scenario, the responses $Y_a$ are independent; it is assumed that spatial variability can be accounted for by cell-to-cell variation in model parameters.

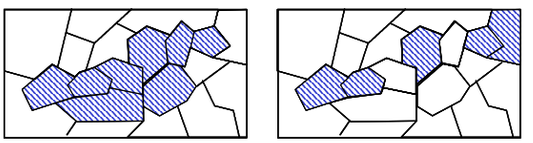
The spatial scan statistic seeks to identify hot spots or clusters of cells having an elevated response with respect to the remainder of the region. Elevated response means large values for the rates (or intensities),

$$G_a=Y_a/A_a,$$

instead of the raw counts $Y_a$. The scan statistic easily accommodates other adjustments, such as for age or gender.

A collection of cells from the tessellation should satisfy several geometric properties before it can be considered as a candidate for a hot-spot cluster. First, the union of the cells should comprise a geographically connected subset of the region $R$ (Figure 2). Such collections of connected cells will be referred to as zones Z and the set of all zones is denoted by $\Omega$. Second, the zone should not be excessively large. Otherwise, the zone instead of its exterior would constitute the background. This restriction is generally achieved by limiting the search for hot spots to zones comprising of less than, say, 50% of the region.

*Figure 2. A tessellated region. The collection of shaded cells in the left-hand diagram is connected and, therefore, constitutes a zone in $\Omega$. The collection on the right is not connected.*



The notion of a hot spot is inherently vague and lacks any a priori definition. There is no true hot spot in the statistical sense of a true parameter value. A hot spot is instead defined by its estimate, provided the estimate is statistically significant. To this end, the scan statistic adopts a hypothesis testing model in which the hot spot occurs as an unknown zonal parameter in the statement of the alternative hypothesis.

The traditional spatial scan statistic uses expanding circles to determine a reduced list $\Omega_0$ of candidate zones Z. By their very construction, these candidate zones tend to be compact in shape and may do a poor job of approximating actual clusters. The reduced parameter space of the circular scan statistic is determined entirely by the geometry of the tessellation and does not involve the data in any way. We propose a scan statistic that takes an adaptive point of view in which $\Omega_0$ depends very much upon the data. Furthermore, $\Omega_0$ induces a tree structure useful for visualization and expressing uncertainty of hot-spot clusters in the form of a hot-spot confidence set on the tree.

Although the traditional spatial scan statistic is applicable only to tessellated data, the ULS approach has an abstract graph (i.e., vertices and edges) as its starting point. Accordingly, this approach can also be applied to data defined over networks, such as subway, water, or highway systems. There is complete flexibility regarding the definition of adjacency. For example, one may declare two cells as adjacent if (a) their boundaries have at least one point in common, (b) their common boundary has positive length, or (c) in the case of a drainage network, the flow is from one cell to the next.

## ULS Scan Statistic

The ULS scan statistic is an adaptive approach in which the reduced parameter space $\Omega_0=\Omega_{ULS}$ is determined from the data using the empirical cell rates:

$$G_a=Y_a/A_a.$$

These rates determine a function $a\rightarrow G_a$ defined over the cells in the tessellation. This function has only finitely many values, and each level g defines an upper level set:

$$U_g=\{a:G_a\geq g\}$$

Since upper level sets do not have to be geographically connected (Figure 3), we take the reduced list of candidate zones $\Omega_{ULS}$ to consist of all connected components of all possible upper level sets. The zones in $\Omega_{ULS}$ are plausible as potential hot spots since they are portions of upper level sets of the response rate. The number of zones is small enough for practical maximum likelihood search; in fact, the size of $\Omega_{ULS}$ does not exceed the number of cells in the tessellation.

A ULS tree can be defined on the reduced parameter space $\Omega_{ULS}$. Its nodes are the zones $Z\in\Omega_{ULS}$ and are therefore collections of vertices from the abstract graph. Leaf nodes are typically singleton vertices at which the response rate attains a local maximum. The root node consists of all connected vertices in the abstract graph. Figure 4 shows the tree structure for the surface from Figure 3.

*Figure 3. Schematic response surface with two response levels, g and g'. The upper level set determined by g has three connected components, $Z_1$, $Z_2$, and $Z_3$, that determined by g' has $Z_4$, $Z_5$, and $Z_6$ as its connected components. The diagram also illustrates the three ways in which connectivity can change as the level drops from g to g': (a) Zones $Z_1$ and $Z_2$ grow in size and eventually coalesce into a single zone $Z_4$, (b) zone $Z_3$ simply grows to $Z_5$, and (c) zone $Z_6$ is newly emergent.*

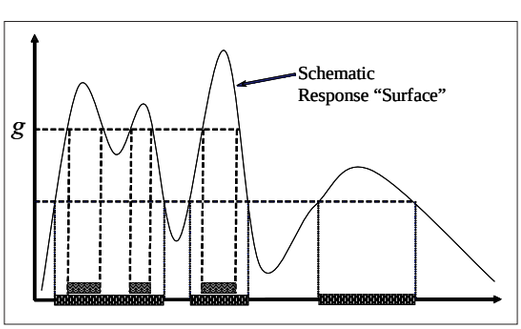
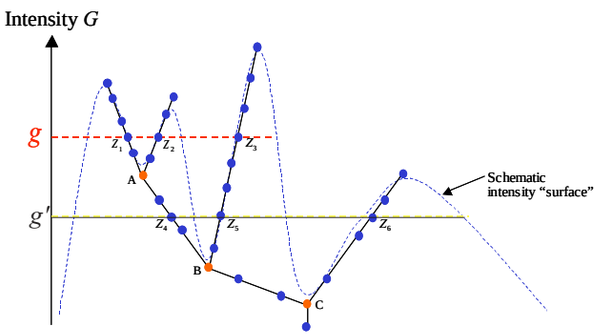



*Figure 4. ULS connectivity tree for the schematic surface displayed in Figure 3. The four leaf nodes correspond to surface peaks. The root node represents the entire region. Junction nodes (A, B, and C) occur when two (or more) connected components coalesce into a single connected component.*




A consequence of the adaptivity of the ULS approach is that $\Omega_{ULS}$ must be recalculated for each replicate in a simulation study. Efficient algorithms are needed for this calculation. Several generic algorithms are available in the computer-science literature (Cormen, Leierson, Rivest, & Stein, 2001, Section 22.3 for depth-first search; Knuth, 1973, p. 353; Press, Teukolsky, Vetterling, & Flannery, 1992, Section 8.6 for transitive closure).

## Hot-Spot Membership Rating

Zonal estimation uncertainty is visually depicted by inner and outer envelopes, where the outer envelope consists of all cells belonging to at least one zone in the confidence set. Cells in the inner envelope belong to all of the zones in the confidence set. In other words, the outer envelope is the union of all zones in the confidence set while the inner envelope is their intersection (Figure 5 and Figure 6).

*Figure 5. Estimation uncertainty in hot-spot delineation. Cells in the inner envelope belong to all plausible estimates (at specified confidence level); cells in the outer envelope belong to at least one plausible estimate. The MLE is nested between the two envelopes.*

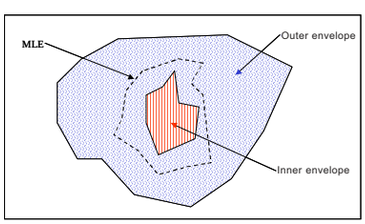
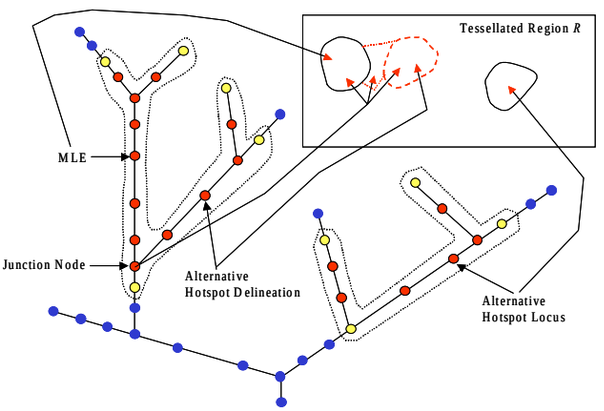


*Figure 6. A confidence set of hot spots on the ULS tree. The different connected components correspond to different hot-spot loci, while the nodes within a connected component correspond to different delineations of that hot spot—all at the appropriate confidence level.*




A numerical rating may also be assigned to each cell for inclusion in the hot spot. The rating is the percentage of zones in the confidence set that includes the cell under consideration. The inner envelope consists of cells receiving a 100% rating while the outer envelope contains the cells with a nonzero rating. A map of these ratings, with the superimposed MLE, provides a visual display of uncertainty of the hot-spot delineation.

## Typology of Space-Time Hot Spots

Scan statistic methods extend readily to the detection of hot spots in space and time. A space-time version of the circle-based scan statistic employs cylindrical extensions of spatial circles, but cylinders are often unable to adequately represent the temporal evolution of a hot spot (Figure 7). The space-time generalization of the ULS scan statistic can detect arbitrarily shaped hot spots in space and time (Patil & Taillie, 2004b). This lets us classify space-time hot spots into various evolutionary types, a few of which appear on the left-hand side of Figure 8. The merging hot spot is particularly interesting because, while it comprises a connected zone in space and time, several of its time slices are spatially disconnected. The diagrams in Figure 8 are motivated by a study on trajectories of persistent poverty in the United States being conducted by Amy Glasmeier of Penn State University.

*Figure 7. Temporal evolution of a spatial hot spot is represented by the shape of the hot spot in space and time. Cylinders may not adequately capture this shape.*

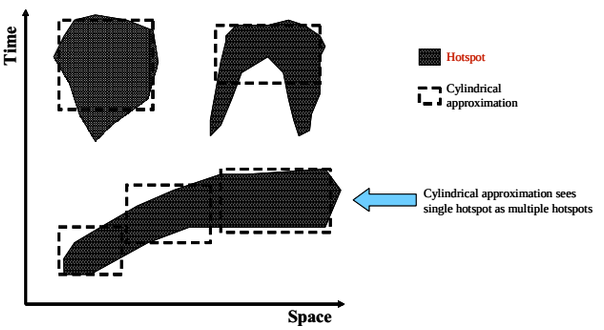
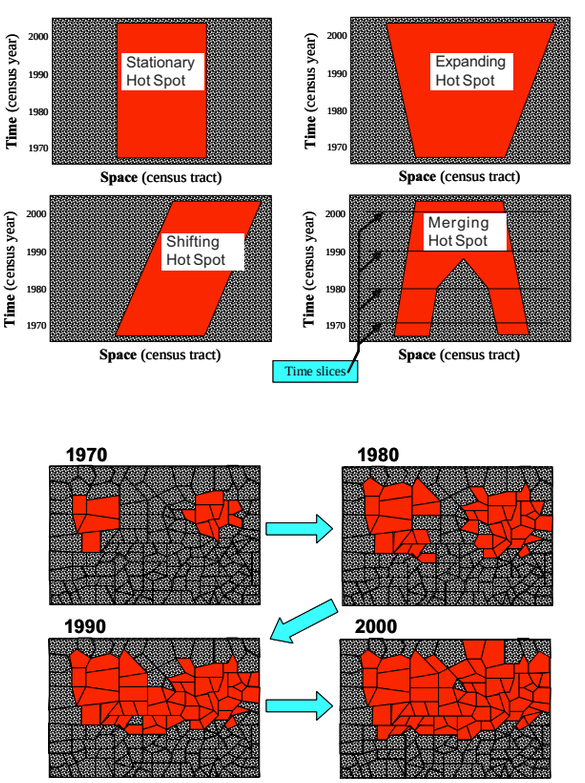



*Figure 8. The four diagrams on the top depict different types of space-time hot spots. The spatial dimension is represented schematically on the horizontal axis while time is on the vertical axis. The diagrams on the bottom show the trajectory (sequence of time slices) of a merging hot spot.*



## PARTIALLY ORDERED SET HOT-SPOT PRIORITIZATION SYSTEM

The prioritization system of hot-spot geoinformatics is concerned with the ranking of a finite collection of objects when a suite of indicator values is available for each member of the collection. The objects can be represented as a configuration of points in indicator space, but the different indicators typically convey different comparative messages, and there is no unique way to rank the objects while taking all indicators into account. A traditional approach is to assign a composite numerical score to each object by combining the indicator information in some fashion. Consciously or otherwise, every such composite involves judgments (often arbitrary or controversial) about trade-offs or substitutability among indicators.

Rather than attempting to combine indicators, Patil and Taillie (2004a) take the view that the relative positions in indicator space determine only a partial ordering, and that a given pair of objects may not be inherently comparable. Working with Hasse diagrams of the partial order, they study the collection of all rankings compatible with the partial order. In this way, an interval of possible ranks is assigned to each object. The intervals can be very wide. Noting, however, that ranks near the ends of each interval are usually infrequent under linear extensions, a distribution is obtained over the interval of possible ranks. This distribution, called the rank-frequency distribution, is unimodal, is log concave, and represents the degree of ambiguity involved in attempting to assign a rank to the corresponding object.

*Figure 9. Hasse diagram and corresponding linear extension tree. The linear extension tree enumerates all admissible linear extensions of the poset. Dashed links in the dimension tree are not implied by the partial order and are called jumps. If one tries to trace the linear extension in the original Hasse diagram, a jump would be required at each dashed link.*

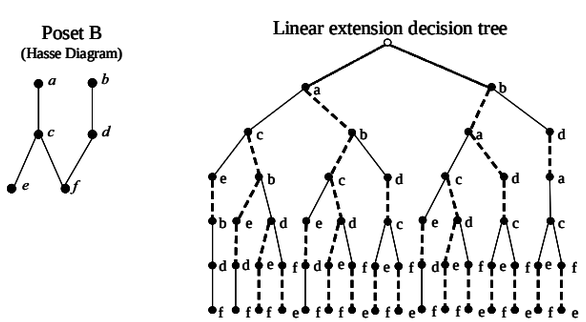
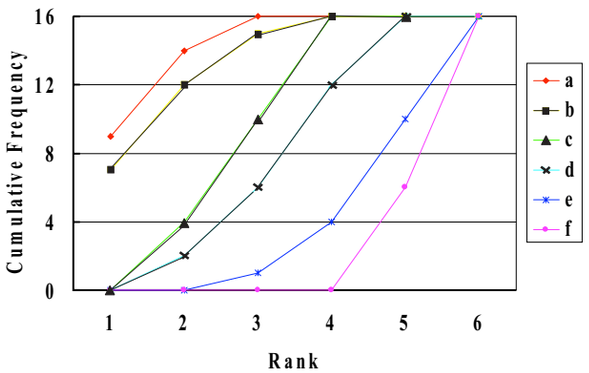



*Figure 10. Cumulative rank-frequency distribution for the poset in Figure 9*




The stochastic ordering of distributions imposes a partial order on the collection of rank-frequency distributions. This collection of distributions is in one-to-one correspondence with the original collection of objects, and the induced ordering on these objects is called the cumulative rank-frequency (CRF) ordering, extending the original partial order. For example, Figure 9 shows the Hasse diagram for a small partially ordered set (poset) with six objects, labeled a through f. The decision tree on the right enumerates all possible linear extensions of the poset, where each path through the tree determines a linear extension. In this example, there are a total of 16 linear extensions. Object a is assigned Rank 1 by nine of those extensions, Rank 2 by five of the extensions, and Rank 3 by the remaining two extensions. The cumulative rank frequencies for Object a are thus 9, 9+5=14, and 9+5+2=16. These determine a cumulative rank profile for Object a as shown in Figure 10 and similarly for the other five objects.

For this example, the six profiles are stacked one above the other, thus determining a linear ordering of the objects. The CRF operator treats each linear extension as an equal voter in determining the CRF ranking. It is possible to generalize to a weighted CRF operator by giving linear extensions differential weights either on mathematical grounds (e.g., number of jumps) or empirical grounds (e.g., indicator concordance). Explicit enumeration of all possible linear extensions is computationally impractical unless the number of objects is quite small. In such cases, the rank frequencies can be estimated using discrete Markov chain Monte Carlo (MCMC) methods.

The resulting prioritization system has the following innovative features.

- Ability to rank and prioritize hot spots
- Utilizes multiple indicator and stakeholder criteria without integrating indicators into an index

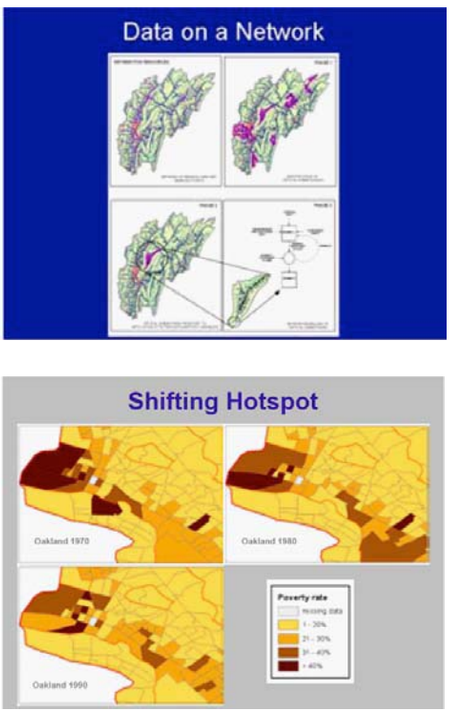
- Employs Hasse diagrams, partially ordered sets, and Markov Chain Monte Carlo computations leading to several key applications, including the following.
- Early warning systems
- Identification of critical areas for focused investigation

In the areas of health policy, health statistics, and disease etiology, the prioritization component may be combined with a hot-spot detection component to yield a three-stage surveillance system:

- **First-Stages Screening:** Identification of significant clusters (hot spots) by a ULS version of the scan statistic
- **Second-Stage Screening:** Rank and prioritize significant hot spots using likelihood values and other attributes such as raw intensity values, remediation-feasibility scores, and socioeconomic and demographic factors
- **Third-Stage Screening:** Follow up hot spots for etiology and/or intervention

For more details, see Patil and Taillie (2004a).

*Figure 11. Data on a network of streams (top) and shifting poverty hot spots (bottom)*




## SELECT CASE STUDIES

In response to an ever-increasing volume of georeferenced data, government agencies require a new generation of decision-support systems for the early detection, surveillance, and prioritization of hot spots. A decision-support framework for geographic and network surveillance, using systems involving upper level sets and partially ordered sets, is applicable to a variety of important case studies, such as the following:

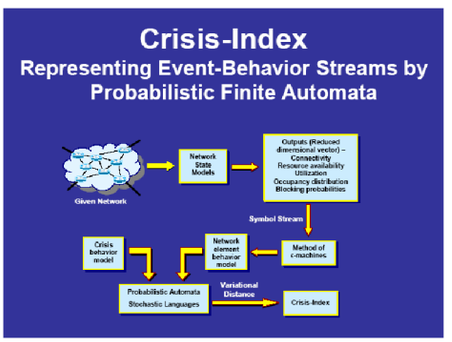
1. Cyber security and computer network diagnostics
2. Tasking of self-organizing surveillance mobile sensor networks
3. Drinking-water quality and water utility vulnerability
4. Surveillance network and early warning
5. West Nile virus
6. Crop pathogens and bioterrorism
7. Disaster management such as oil spill detection, monitoring, and prioritization
8. Network analysis of biological integrity in freshwater streams

The framework can be applied to irregular networks, such as those formed by streams (Figure 11), political units, social networks, and the Internet. When applied to data collected over both space and time, the ULS scan statistic system may be used to detect shifting poverty hot spots (Figure 11), the coalescence of neighboring hot spots, or their growth.

Protecting the nation's computer networks from cyber attacks is an important homeland security priority requiring diagnostic tools for detecting security attacks and infrastructure failures. A probabilistic finite state automaton (PFSA), describing a network element, is obtained from its data stream output. The variational distance between the stochastic languages generated by normal and crisis automata may be used to form a crisis index. The ULS scan statistic is then applied to crises indices over a collection of network elements for hot-spot detection. These hot spots and their prioritization can be used to detect coordinated attacks geographically spread over a network. Additional applications of PFSA include the tasking of self-organizing surveillance mobile sensor networks, geotelemetry with wireless sensor networks, video-mining networks, and syndrome surveillance in public health.

The National Tsunami Hazard Mitigation Program (NTHMP) is the first systematic national effort for the production of inundation maps essential for tsunami

*Figure 12. Framework for probabilistic finite state automata (top), and a metric for measuring the distance between two finite state automata*



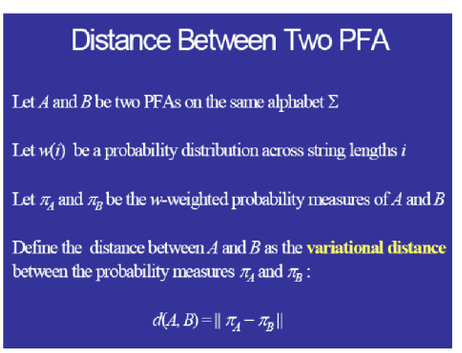
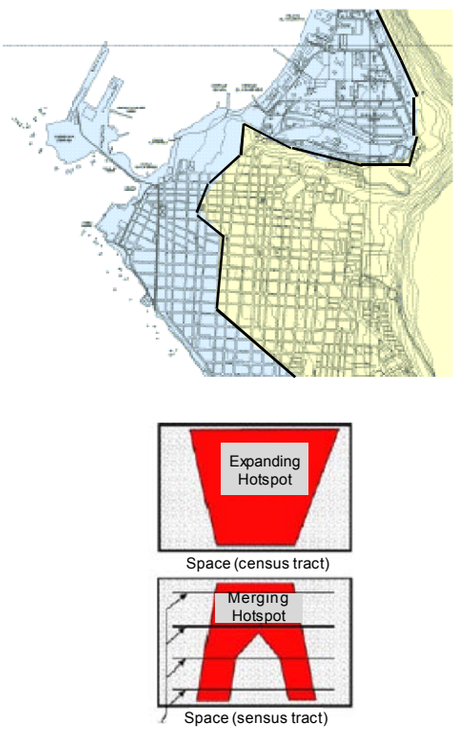




*Figure 13. Portion of a community projected to be inundated by a tsunami as predicted under a tsunami inundation model for a given earthquake scenario (region on the left). Two typologies expected under tsunamis of increasing severity (right).*



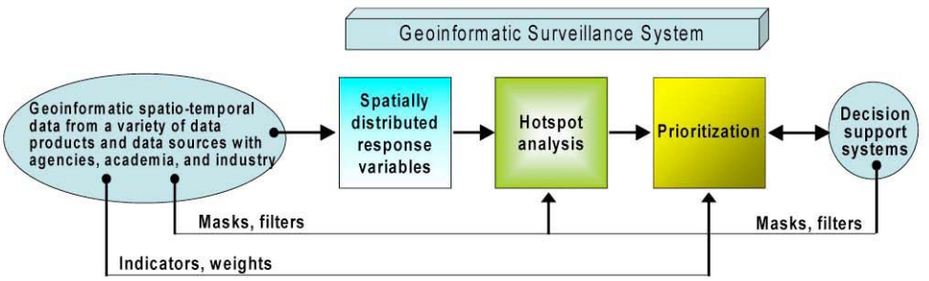

hazard planning and mitigation. Without a clear understanding of what areas are most at risk, it is not possible to develop effective emergency response plans involving population and infrastructure vulnerability and evacuation routes (Gonzalez, 2001). Inundation maps enable the construction of tsunami risk maps, where risk is the hazard multiplied by the exposure; for example, the probability that a particular grid cell is struck by a tsunami times the number of people occupying that cell. These form risk surfaces defined over tessellations of grid cells in regions under consideration. For purposes of optimal disaster management planning, it is essential to have the capability to recognize priority high-risk areas with minimal false alarms. Tsunami disaster management triggers research, expanding its scope to geospatial continuous-response risk variables with skewed distributions, and to hot-spot trajectories representing changing spatial patterns of inundated areas with increasing tsunami severity. Understanding the latter typology may impact the planning of evacuation routes. Under an expanding hot-spot scenario, traffic is always directed outward from the hot spots, but under merging hot spots, a portion of the traffic may be directed through regions between hot spots when the tsunami is predicted to be small. Another significant contribution to tsunami disaster management will be to prioritize and rank risk hot spots detected at specified confidence levels with respect to multiple criteria, stakeholders, and indicators without reduction to a single index. Examples of such criteria may include the number of people at risk and the economic value of infrastructure, buildings, and their contents.

## CONCLUSION

Government agencies often require concise summaries of georeferenced data to support their decisions regarding the geographic allocation of resources. Geoinformatic surveillance for spatial and spatiotemporal hot-spot detection and prioritization is a critical need for the 21st century. A hot spot can mean an unusual phenomenon, anomaly, aberration, outbreak, or critical area. Hot-spot delineation and prioritization may be required for etiology, management, or early warning.

This article briefly describes a prototype geoinformatic hot-spot surveillance (GHS) system for hot-spot delinea-

*Figure 14. Framework for the Geoinformatic Hotspot Surveillance (GHS) system.*




tion and prioritization (Figure 14) in a variety of case studies of critical societal importance. The prototype system is comprised of modules for (a) hot-spot detection and delineation, and (b) hot-spot prioritization.

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## KEY TERMS

**Digital Government Case Studies:** Investigations of interest to society demonstrating the efficacy of proposed digital informatic approaches to handling government databases.

**Early Warning:** Alert to a pending disaster.

**Hot Spot:** A connected subset of the study region with statistically significant elevated rates of disease, poverty, accidents, or any other relevant georeferenced phenomenon.

**Hot-Spot Rating:** Confidence level that a given cell belongs to a hot spot.

**Poset Prioritization and Ranking System:** Nonparametric approach to ranking objects using multiple indicators based on cumulative rank functions constructed from Hasse diagrams and linear extension trees.

**Typology of Space-Time Hot Spots:** Classification of the trajectories of hot spots over time when the upper level set scan statistic system is applied to space-time data.

**Upper Level Set Scan Statistic System:** Adaptive system for hot-spot detection and delineation based on upper level sets in georeferenced data.

# How Business Changes Government in the Information Age

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*University of Amsterdam, The Netherlands*

## INTRODUCTION

EzGov is a leading company providing online solutions for governments. Ed Trimble, EzGov CEO, states, "He's doing something that's changing government, that's changing the world, that's really making a difference" (Diana, 2004). This article is about changing government. Considered as the main agent to change government are politics. Mainstream studies of public administration also consider government itself, judges and citizens as change agents. This fits with the classical, liberal vision on the public domain, wherein these parties are the only known subjects (see Howlett & Ramesh, 1995, pp. 52-59; Stone, 1997, pp. 351-372). In this vision companies are considered to be citizens. Problem then is to see clearly the profound influence business has on governmental change.

With increasing velocity information technology products appear on the market that are especially designed to change government. Also with other products the government buys its own change, for instance with management consultancy. In the study of public administration a good view lacks on the importance business has here in changing government. That's the focus of this article, what's its purpose? First purpose is to give an explanation of the way business changes government with the products it sells. Second purpose is to come up with ideas on how to deliberately accept change of government by way of business products. How to do that in a way that both government and business will function better and present society with legitimate solutions for physical and social problems?

## BACKGROUND

The market is acknowledged as an instrument that changes the physical and social environment (Howlett & Ramesh, 1995, p. 86). Often the market is placed in a system of three factors that change the environment, the two others being government and civil society. In order to function at their best government, market and civil society each needs to solve those problems it can solve best, and leave other problems to one of the other two (Stone, 1997, pp. 66-79). For instance fighting crime is a task for government, making cars is what the market does, and organizing a soccer match is something of civil society. However, certain soccer matches do concern both the market and government, so the division of tasks is not sharp.

Scholars of public administration have only distinguished three factors (Stone, 1997, pp. 259-262), but there is one more factor that changes the physical and social environment, design (Howlett & Ramesh, 1995, p. 160; Lessig, 2004, pp. 139-173; Murray & Scott, 2002). Think of cars and how they have changed the lives of people, both physical and social. The design of cars is an example of a social and physical co-evolution (Nelson & Nelson, 2002; Nelson, Bhaven, & Sampat, 2001). For instance, safety measures are a physical reaction to the physical and social damage that car accidents can bring. It's this very co-evolution that brings to the fore how the relations change between government, market, civil society, and also design. Cars can give prove of that: the market supplies them, the government regulates that, civil society is important to give voice to the interests being harmed by cars, like health and nature, and design is used to give answers to new regulation and the pressure from civil society.

This picture of the interference between these four factors explains how the market is one factor that changes government. Therefore, parties that change the market do change government. Those can be parties like business, consumers, courts, special interest groups, and even the government that changes the market and thus itself. Theory of public administration takes account of the influence these parties have on the market, and the market has on government. What lacks is a good view on the influence that products and their design have. In this view business as the main supplier of products is a major change agent of the government.

## BUSINESS AS CHANGE AGENT OF GOVERNMENT

Domotica stands for home automation. The market supplies most domotica products, for instance remote control

of heating, lighting, curtains, and even doors. The government can make it obligatory that all domotica products comply with technical standards, but often that's something the market can organize itself. An important group of Dutch domotica companies not only discuss technical standards amongst themselves, but also involve civil society. They have an open eye for especially patient groups that are important in the process of defining products and their technical standards. In fact, the organization of these companies can also be considered as a phenomenon that belongs to civil society. Together with other representatives of civil society, patient groups, it regulates both the market, and defines design. This is a task the government could execute, and it will want to control how these parties perform. Reason to do so is that domotica takes out of the hands of the government important parts of health care, when it results in patients living in their homes longer.

The replacement of care to homes diminishes the demand for care in hospitals, that in many countries is financed by the government. This also has consequences for civil society. Elderly and sick people living in communities longer demand citizens to organize care amongst each other more. All this proves how the information technology, that domotica consists of, changes the relations between government, market, civil society, and design. This is a socio-physical co-evolution wherein innovations in technological design of domotica both change government, market, and civil society, and change themselves under the influence of these three. Part of this picture of changing relations is the relation between business and government. As an important supplier of technological products, business incites many changes in the relations between government, market, civil society, and design. Business is therefore a change agent of the government. How to take control of that?

## PRACTICAL IDEAS ON HOW TO CHANGE GOVERNMENT BY WAY OF BUSINESS

In the Netherlands, roads are the responsibility of municipalities, water boards, provinces and the state government. In the region of The Hague, a process has started in 2003 wherein these parties handed over their responsibility to a regional mobility manager. This would never have happened without preceding technological innovations enabling to really manage traffic on a regional basis: especially video monitoring, computer programs for the analysis of traffic and the possibility to send one to one text messages to mobile phones of traffic users. At the moment mobility managers are looking for ways to cooperate with commuters and the managers of sites where many work. Therefore they're in need of new technologies and have asked the industry to come up with custom made designs to manage traffic in cooperation with commuters and these managers.

What becomes apparent is a co-evolution of governmental organization and technology (Van Est, 1999, pp. 283-284, 337, 341-342): first technology enables municipalities, water boards, provinces and the state government to hand over responsibility, and now new cooperative practices are in need of further technological innovations. What also becomes apparent is how the government has an instrument in asking the industry for new products (Hajer & Kesselring, 1999, pp. 17-25). How to make use of this instrument to take control over the way these products will change government? If indeed business is an important change agent of the government, then purchasing and giving assignments is the way for the government to influence its own change. It can do so for instance by getting involved in the process of designing the products it will buy. In that dialogue government can challenge designers to come up with an assessment of what the products they make will mean for government and the way it functions. At the same time, the designers can challenge the government to order that very technological innovation it dares to take responsibility for. Thesis here is that government can respond to business as a change agent by looking at the way is buys and gives assignments, for instance by way of organizing this dialogue with its suppliers.

An instrument the government can work with is public procurement. This is certainly not unknown, but not acknowledged as an instrument that should fit in somewhere with well known governmental instruments like legislation, communication, finance and governance. It should however fit in because with the help of public procurement the government initiates very large projects like building roads, city renewal and the installation of information technology. On the one hand, this is often done with scrutiny, meaning that the government takes good care to select the best supplier and not to pay too much. On the other hand it's not standing practice to assess what chain of events will follow from for instance building a road. The causes and effects following from that can have a huge impact on the physical and social environment, and also on the government itself. Trying to influence those causes and effects is only now getting to governments as something they should do. An example is green public procurement (European Commission, 2004). There it can become an important instrument to protect the environment.

What change of itself does a government buy? It should demand from companies to make it aware of all the causes and effects that can be expected from a product

when the government buys and uses it. Important to assess those causes and effects is a dialogue that could also include representatives of civil society. Idea is that only the most challenging dialogue develops the best products. In this dialogue the impact of a product on the social and physical environment is assessed, and amongst that the impact on the functioning of government itself. At such a moment a so-called constructive technology assessment takes place (Rip, 1997). The results of that should be included in the assignment the government finally gives to a company. Does that guarantee that the governmental change will also be legitimate?

## LEGITIMACY

Implementing spatial plans can have huge consequences for the physical and social environment. Therefore, in most countries parties representing an involved interest have the right to give voice and comment to the government before it permits implementation. In more than one country companies supply information technology that both presents the plans and is a means to give voice and comment by way of the internet. This is a service that makes life much easier for parties representing involved interests. However, their communication changes significantly when they give voice and comment electronically. Even if they're not obliged to do so, and still have the chance to meet people from the government in person, the relationship has changed, because they may feel the need to explain why the electronic alternative has been ignored.

True advocates of people's rights give ample warning for all the dangers of information technology (e.g., Lessig, 2004, p. 173), but have an open eye of course for all the benefits. Each innovation of a product has to be good and at the same time right. Good meaning that a product has more effect and is more efficient, right meaning that the involved people and interests are being treated in a fair way (Richardson, 1995, p. 115). Government is a guarantee in society that both actions from the government itself, and from companies, citizens, and citizens groups are legitimate. Any change of the government therefore has to be legitimate, but what is that, and how to assess that?

Formally a change of the government is legitimate when the government itself agrees, and can successfully defend this change before elected representatives of the people. Material legitimacy means that after the change the physical and social environment are better of, and people and their interests have been treated fairly. Of course representatives have the primacy to assess that, and questions concerning fairness can be fought over in court (Dworkin, 1986, pp. 52-65, 176-184). However, in modern society it often falls short to leave that all to parliament and courts. Companies more and more have to ask beforehand if the effects of their products on the government are both good and right. It's wise to do that in dialogue. Without the help of the government, citizens and citizen groups' risk can be too high that a company on its own gets it wrong.

All these parties have discovered how they all benefit from dialogue. Therefore product innovation more and more takes place in close cooperation, like in the example of domotica. Product innovation in cooperation with governments and citizens groups takes place in dialogue wherein also government policy and the policies of citizens groups develop. Idea is that in many cases this leads to more efficacy, efficiency, and also fairness. When for instance the new product of a company is developed under these circumstances chances are better that government and citizens will accept it (Bijker, Hughes, & Pinch, 1993). Is this a product that as a consequence changes government, than chances are better that this happens in a legitimate way.

## FUTURE TRENDS

Do we need a new perspective on companies in a society looking for legitimate solutions, and wherein information technology gains importance every day? This question belongs on the agenda of not only scholars of public administration. If it turns out to be an important question than also politicians and citizens should ponder it. Another question is how elected officials both in executive and parliamentarian positions should overlook governmental agencies purchasing products and giving assignments to design products. One more question is whether the above-mentioned dialogue can be organized in such a way that citizens that will be affected by the product can have a part in the process of design. Does this improve products and make them really competitive? This opens up a whole new point for discussion if it's taken into account that underneath the use of dialogue lies a world of cultural evolution and differences, for instance between the United States and Europe (Rifkin, 2004). Is the one society better fit than the other to have dialogue and thus innovate products?

Will companies that alter the government put emphasis on characteristics that appeal to them, but that the government traditionally does not really value? Will they for instance regard the citizen more as a client instead of an object of policy like the government often is used to? If so then governmental service might improve, but at the same time a client is expected to come and ask for what he wants. Objects of policy instead often get what the government has in store for them, whether they like it or

not (Alejandro, 2001). For some people however that's preferable since they have difficulty to know what they can ask for. What's good and what's right? An answer will not follow here (see Lessig, 2004, pp. 7-11), but it's important to know that characteristics of companies will permeate in government once companies change the government.

## CONCLUSION

In the classical, liberal vision on the public domain subjects are the legislature, government, courts and citizens. Each in its own way can change the government. So citizens can do that by way of voting, going to court, and organizing themselves in citizens groups. Companies are not acknowledged as a subject. They are considered to change government the same way as citizens and their groups can, but not as companies as such (Howlett & Ramesh, 1995, p. 66). That doesn't give companies a place at the same level as the legislature, government, courts and citizens. Should companies have that place, or should their role in the formal state remain that of a citizen? Or should the role the citizen traditionally has in the study of public administration be seen in a different light? There are good reasons to understand the citizen and its entrepreneurship as maybe the most important factor of change in society. He is the consultant, the supplier of information technology, and the builder of roads with profound influence on society.

Especially consultants are in the market of selling products to change government. Until about fifteen years ago, this used to be a market for social products only. Social products being methods mainly for organizational change designed to alter the behavior of people working within governmental agencies (Rainey, 1997, pp. 333-336). With increasing velocity technological products enter the market that are especially designed to change government. Does for instance the one municipality buy a product to help citizens give voice and comment regarding its policies then what should the other municipality do? For how long can it lag behind, and when it decides to also buy such a product, what will be on the market then? Ed Trimble: "Another big factor in government's decision to move forward with this is that the state next door or the country next door may be providing a service, and that government's constituents begin expecting that service" (Diana, 2004). This gives the market a position in changing government that is unprecedented and not accounted for in ethics, politics and science. How to understand this development and how to respond to it?

Socio-physical co-evolution is in this article pivotal to understand the way the market changes government, and also gives a guideline how to work as governmental agencies and companies with that. Guideline is to establish a dialogue between government and companies, and wherein also citizens are involved (Grin & Van der Graaf, 1996). From that dialogue should follow the assignment from the government to a company to make products and take account of the effects it will have on the government itself. This dialogue is best organized when a constructive technology assessment takes place wherein government, companies, and citizens participate. The idea is that the effects that the product will have on the government will then be legitimate.

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## KEY TERMS

**Civil Society:** The whole of citizens and their groups that pursue interests of the physical and social environment.

**Constructive Technology Assessment:** Assessment of the physical and social impact of the implementation of a technology in dialogue between involved parties.

**Domotica:** Home automation.

**Environment, Physical:** The environment as far as it consists of natural and cultural phenomena.

**Environment, Social:** The environment as far as it consists of what people think, follow, agree upon, talk about and remember.

**Modern Governance:** The design and implementation of governmental policy in cooperation between governmental agencies, citizens, companies, and interest groups.

**Public Procurement:** Governmental agencies purchasing goods, services, and public works.

**Socio-Physical Co-Evolution:** Transition of social and physical technologies wherein innovation of the one sparks innovation of the other.

**Study of Public Administration:** Scientific discipline pointed at the study of decision-making and organization in the public domain.

**Voice and Comment:** The right of the citizen to give its opinion about a governmental policy beforehand, and ask for a review when it's fixed but not set.

# How People Search for Governmental Information on the Web

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## INTRODUCTION

People are now confronted with the task of locating electronic information needed to address the issues of their daily lives. The Web is presently the major information source for many people in the U.S. (Cole, Suman, Schramm, Lunn, & Aquino, 2003), used more than newspapers, magazines, and television as a source of information. Americans are expanding their use of the Web for all sorts of information and commercial purposes (Horrigan, 2004; Horrigan & Rainie, 2002; National Telecommunications and Information Administration, 2002). Searching for information is one of the most popular Web activities, second only to the use of e-mail (Nielsen Media, 1997). However, successfully locating needed information remains a difficult and challenging task (Eastman & Jansen, 2003). Locating relevant information not only affects individuals but also commercial, educational, and governmental organizations.

This is especially true in regards to people interacting with their governmental agencies. Executive Order 13011 (Clinton, 1996) directed the U.S. federal government to move aggressively with strategies to utilize the Internet. Birdsell and Muzzio (1999) present the growing presence of governmental Web sites, classifying them into three general categories, (1) provision of information, (2) delivery of forms, and (3) transactions. In 2004, 29% of American said they visited a government Web site to contact some governmental entity, 18% sent an e-mail and 22% use multiple means (Horrigan, 2004). It seems clear that the Web is a major conduit for accessing governmental information and maybe services. Search engines are the primary means for people to locate Web sites (Nielsen Media, 1997).

Given the Web's importance, we need to understand how Web search engines perform (Lawrence & Giles, 1998) and how people use and interact with Web search engines to locate governmental information. Examining Web searching for governmental information is an important area of research with the potential to increase our understanding of users of Web-based governmental information, advance our knowledge of Web searchers' governmental information needs, and positively impact the design of Web search engines and sites that specialize in governmental information.

## BACKGROUND

There has been limited large-scale research examining Web searching for governmental information. Croft, Cook, and Wilder (1995) present analysis of the use of THOMAS, a governmental system that makes U.S. legislative information available to the public. The researchers report that searchers used very simple queries and appeared to have trouble locating specific bills. The researchers also noted that was some dissatisfaction with the relevance of returned results. Marchionini and Levi (2004) present an on-going study of the Bureau of Labor Statistics, reporting that user interfaces to governmental Web sites require special attention

Hargittai (2003) reports that users look for governmental information in a variety of ways with considerable temporal variance for task completion. The manner in which content is presented often confuses searchers. Hargittai reports that the two major sources of confusion concerned the uniform resource locator and the page design layout. Ceaparu and Shneiderman (2004) investigated alternate ways of organizing governmental statistics, reporting that users were more successful in finding answers when the information was organized into categories rather than an alphabetical listing.

There is a body of research focusing on general Web searching (Jansen, Spink, & Saracevic, 2000; Spink &

Jansen, 2004). Spink and Jansen (2004) report that searching for governmental information on the Excite search from 1997 to 2001 was about 1.5% to 3% of all queries. Jansen and Spink (2005) report that searching for governmental information on AlltheWeb.com, a Norwegian-based search engine, was about 2.0% of all queries in a study of datasets from 2001 and 2002. Jansen, Spink, and Pedersen (2005) report that searching for governmental information on AltaVista in 2002 was about 1.6%. Overall, few Web queries are related to government information; however, as a stand-alone category, governmental queries are a sizeable percentage.

Although these studies provide important insights into Web searching, further research is needed that validates these results for the searching of governmental information on Web search engines. This is especially important as Web searching systems are continually undergoing changes and governmental entities are moving more services to the Web (e.g., http://usgovinfo.about.com/library/news/aainternet.htm).

We address this need in the present study by examining a set of queries representing governmental-related information needs to analyze how people are searching for governmental information, including what information they are seeking. We also classify a sub-set of these queries to develop a taxonomy that can asset in the development and organization of governmental Web sites.

## FUTURE TRENDS

### Research Questions

The research questions driving this study are:

1. What are the characteristics of governmental Web searching
2. What types of governmental information are people searching for on the Web
3. How effective are these queries in locating governmental information

### Research Design

#### Data Collection

To address the first research question, we obtained, and qualitatively analyzed, actual governmental-related queries submitted to the AltaVista Web search engine. For this research question, we are interested in examining the characteristics of the governmental-related queries, investigating areas such as the number of terms in queries, the number of queries in a session, and the use of query operators, among other aspects. Our analyses of searching behavior addressed the following approaches to Web searching behavior.

a. **Query Length:** The query length is defined as the length, measured in terms, of the entire search query. This may include Boolean operators
b. **Session Size:** A session is the total amount of queries submitted over a period of time. A session may include only one query, or may extend over a longer period of time and include multiple queries
c. **Result Pages Viewed:** Result pages viewed is the number of pages returned by the search engine based on the query submitted that were actually visited by the user

The third research question involved classifying a sub-set of these queries with a controlled hierarchal vocabulary. This has implications not only for searchers using the Web to locate governmental information but also search engines and Web sites that serve these users.

To investigate our research questions, we gathered data from the AltaVista search engine. In 2002, Alta Vista was the 9th most popular search engine (Sullivan, 2002), had a content collection of 550 million Web pages (Sullivan, 2000), and approximately 5.6 million unique visitors per month. Overall, AltaVista offers a full range of searching options, has an extremely large content collection, and millions of unique visitors per month. After being an independent company for several years, Overture Services purchased AltaVista in 2003 (Morrissey, 2003).

We recorded the queries examined for this study on the AltaVista server on Sunday, September 8, 2002 and span a 24-hour period. We checked news stories from this day to see if any looked as if they may have influence the investigation, namely the term analysis. There did not appear to be a major news stories occurring on this date. However, the date is near the anniversary of the 9-11 attacks.

We recorded the queries in a transaction log that represents a portion of the searches executed on the Web search engine on this particular date. The original general transaction log contains approximately 1,000,000 records. Each record contains three fields:

1. **Time of Day:** Measured in hours, minutes, and seconds from midnight of each day as recorded by the AltaVista server
2. **User Identification:** An anonymous user code assigned by the AltaVista server
3. **Query Terms:** Terms exactly as entered by the given user

## Data Analysis

From the complete transaction logs, we were interested in only those queries that were governmental-related. We therefore culled a subset of queries pertaining to government-related information using a modified snowball sampling technique (e.g., Patton, 1990). More specifically, we started with several seed terms (i.e., government, Congress, taxes, license, etc.) that are central indicators of government-related searching. Using this set of terms, we extracted all records from the transaction log that contained these terms.

We then reviewed the extracted records identifying other terms that frequently appeared. These new terms were then combined with the set of original terms, and from the original transaction log we extracted all records that contained these terms. The process was repeated until the addition of new terms to the set added less than ten new and unique queries. This data set permitted us to address our first research question.

For the third research question, we chose 4,000 queries to classify according to a controlled hierarchal vocabulary. We derived this taxonomy from (Brodie, 2002) and organized a five-level hierarchy, which is:

- Level of government (cf., state, local, federal)
- High-level request (cf., forms, information)
- Applicable to (cf., business, citizen)
- Mid-level request (cf., organization of government, aspect of government, tax service)
- Low-level request (cf., information about government, courts, taxes).

With this controlled vocabulary, we were able to classify the queries and then conducted data analysis on the classified queries in order to find any unique relationships or trends within the classification. A complete list of codes within each category is provided in Appendix A.

# Results

## Searching Characteristics

We first address research question one, which is: What are the characteristics of governmental Web searching?

Table 1 presents overall descriptive data for the governmental-related queries.

The number of governmental sessions was 0.8% of the 369,350 sessions in the entire dataset. The number of queries was 0.4% of the 1,073,388 queries in the data set. The set of governmental queries contained 1.3% of the unique terms in the complete transaction log and represents 0.6% of all terms.

*Table 1. Aggregate results of searching characteristics*

| | | | | | |
|---|---|---|---|---|---|
| **Sessions** | 3,021 | 0.8% of all session | | | |
| **Queries** | 4,694 | 0.4% of all queries | | | |
| **Terms** | | | | | |
| *Unique* | 3,867 | 1.3% of all unique terms | | | |
| *Total* | 18,873 | 0.6% of all terms | | | |
| | **Mean** | **Max** | **Min** | **Mode** | **SD** |
| **Mean terms per query** | 4.02 | 20 | 1 | 3 | 2.06 |
| **Terms per query** | **Occurrences** | **%** | | | |
| *1 term* | 221 | 5% | | | |
| *2 terms* | 802 | 17% | | | |
| *3+ terms* | 3,671 | 78% | | | |
| *Total* | 4,694 | 100% | | | |
| | **Mean** | **Max** | **Min** | **Mode** | **SD** |
| **Mean queries per user** | 1.55 | 16 | 1 | 1 | 1.19 |
| | **Occurrences** | **%** | | | |
| **Users modifying queries** | 938 | 31% | | | |
| **Session size** | **Occurrences** | **%** | | | |
| *1 query* | 2,083 | 69% | | | |
| *2 queries* | 588 | 19% | | | |
| *3+ queries* | 350 | 12% | | | |
| *Total* | 3,021 | 100% | | | |
| | **Occurrences** | **%** | | | |
| **Boolean Queries** | 343 | 7% | | | |
| | **Occurrences** | **%** | | | |
| **Terms not repeated in data set** | 2,384 | 13% | | | |
| | **Occurrences** | **%** | | | |
| **Use of 100 most frequently occurring terms** | 10,337 | 55% | | | |

*Figure 1. Percentages of queries within level of government categories*

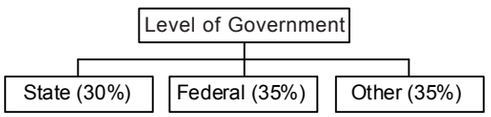



*Figure 2. Percentages of queries for type of high-level request*

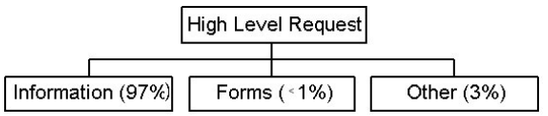



*Figure 3. Percentages of queries at applicable to user types*

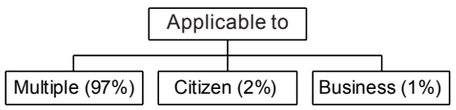
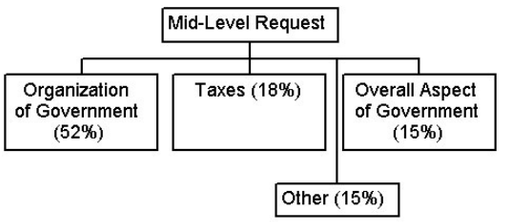



*Figure 4. Percentages of queries for type of mid-level request*




The number of queries in a session and the number of terms in a query are indicators of the complexity of the searcher's information need, with the greater number of queries and terms indicating the greater complexity. The number of terms per query (4.02 terms) is substantially higher than for Web searching in general, which is about 2 terms (Spink & Jansen, 2004). This may indicate that governmental information is more difficult to locate than general Web information or that these searchers have a more refined information need.

The number of one query sessions (69%) is much higher than the entire transaction log, at 47.6% one query sessions (Jansen, Spink, & Pederson, 2005). The percentage use of Boolean and terms not repeated in the data were comparable to the entire data set. The percentage use of the 100 most frequently occurring terms (55%) was higher than the entire data set (14%), but this may be expected due to the tighter topic domain.

## Types of Governmental Information

To address research question two, (i.e., What types of governmental information are people searching for on the Web?), we took 4,000 of the governmental queries and classified them using our five-level hierarchy. The first level of classification is level of government. This category includes federal, state, local, city, county, and so forth. Figure 1 presents an overview of the results for this category.

Queries in the Other category were typically searches for local, city or county related governmental information. The other two main levels of government searched for, state and federal, accounted for 65% of all government-related queries.

The next level of classification is high-level request. This level includes requests for information, forms, services, and so forth. Figure 2 shows the breakdown of the results for this category.

From Figure 2, we see that 97% of the requests were for information, with only 1% for forms. There were very few queries seeking governmental services. This distribution may be because of the preponderance of information of the Web and a lack of awareness of governmental services that are available.

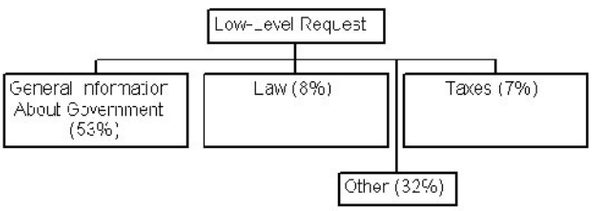
The small percentage of forms at first was surprising, but this may be due to the use of the AltaVista search engine for data analysis. Searchers may be using the search engine to locate the overall government site (i.e., Internal Revenue Service). Once at the site, they may be searching for the particular form or specific information.

The next category we examined is not necessarily a request level, but an applicable to level. This level includes multiple parties, citizen, business, and so forth. Figure 3 shows the breakdown of the results we found for this category.

This classification attempts to address who would be searching for information and could lead to creating an accurate taxonomy or Web site for the user's interest. Unfortunately, when we look at the results of the counts, the largest percentage of the searches is applicable to multiple parties. That is, the query was not specific enough to say who exactly was searching for the information. The other two categories that make up the remainder of the counts are citizens and businesses.

We then classified queries at the mid-level request. This level includes requests for information about orga-

*Figure 5. Percentages of queries for type of low-level request*




nization of government, taxes, some overall aspect of government, and so forth. Figure 4 illustrated the breakdown of the results we found for this category.

The mid-level request attempts to classify further what exactly is the information need of the query. For example, we can now say that a citizen is looking for basically information about an organization of government. This information is vital when creating accurate taxonomies.

Looking at the percentages in Figure 4, we see that a large percentage of the requests were for an organization of government such as an agency or branch of government. Requests for tax related information is the second largest percentage, followed by a request for some overall aspect of government. Finally, requests for some overall aspect of government was a popular one mostly due to people wondering about general government of the U.S. and policy issues about how government operates.

The fifth level we chose to look at is the low-level request. This level includes general information about government, law, taxes, and so forth. Figure 5 shows the breakdown of the results we found for this category.

At this level we come as close as we can to pinpointing what exactly a query was searching for. The percentages again show a strong favoring of general information about government, information about some aspect of government, and so forth. This illustrates that mostly what government related queries are after is general information. This is very helpful because a taxonomy is created to organize information.

Other categories that come up as noticeable percentages in the low-level requests are law and taxes. These are both very important aspects of government that deserve to be separated into their own unique categories in order to be further broken down to help direct users to the proper information source.

## Effectiveness of Governmental Queries

To address research question three (i.e., How effective are these queries in locating governmental information?), we took the top ten governmental queries and submitted them to Google. We submitted the queries on October 26, 2004 using an automated process. The total submission time was approximately 25 seconds. We downloaded the top 20 results for each of these 10 queries, resulting in 200 results for evaluation. Our criterion for relevance was straightforward, "Was the resulting uniform resource locator (URL) within the gov domain (including U.S. state and mil domains)?" If the URL was in the gov domain, than we considered that result relevant. If the URL was not in the gov domain, than we considered that result no relevant. The results are displayed in Table 2.

For our 200 results, 64 (325) were relevant and 136 (38%) were not relevant.

## CONCLUSION

From our analysis, it appears that searching for governmental information requires more terms relative to general Web searching. There are also predictable categories of

*Table 2. Aggregate results of effectiveness of governmental queries*

| Query | Relevant | % | Non-relevant | % |
|---|---|---|---|---|
| Florida department of revenue | 7 | 35% | 13 | 65% |
| "White House" | 10 | 50% | 10 | 50% |
| Estate taxes | 8 | 40% | 12 | 60% |
| +government +"people's party" | 1 | 5% | 19 | 95% |
| California Department of Social Services | 13 | 65% | 7 | 35% |
| North Dakota State Departments "North Dakota department" | 5 | 25% | 15 | 75% |
| Clinton, Pentagon speech, 1998 | 3 | 15% | 17 | 85% |
| San Bernardino sheriff "sheriff's department" | 7 | 35% | 13 | 65% |
| GA census +1880 | 4 | 20% | 16 | 80% |
| Washington State Department of Motor Vehicles Seattle | 6 | 30% | 14 | 70% |
| | 64 | 32% | 136 | 68% |

searching for government information on the Web, with most queries applicable to multiple types of searchers. Searchers appear primarily interested in information about government rather than services. It may be difficult to try and isolate particular information objects to sets of users, as queries tend to transcend multiple groups. The relevance of governmental queries is about 32%, with even generous criteria of relevance. This may indicate that governmental agencies have a ways to go to push their information and services to the general population.

Results of this research may lead to better organization of governmental Web information and increase the availability of government service, making them easier to locate. This type of research can lead to the creation of more effective government portals.

As governmental agencies continue to push information, forms, and services to their citizenry, it is imperative that they continue to account for the role that search engines have in the process of getting this information to the general population. It is apparent that any categorization will be of limited value to the multitude of users. So, a reliance on indexing and searching will be needed.

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## KEY TERMS



**E-Government:** The use of information and communications technologies to improve the efficiency, effectiveness, transparency and accountability of government.

**Online Governmental Information:** Governmental related information available on the Web.

**Searching for Governmental Information:** The tasking of attempting to locate relevant online governmental information.

**Web Searching:** The tasking of attempting to locate relevant information on the Web

## APPENDIX A

*Table 3. Level of government*

| Code | Description |
|---|---|
| City | Request to a city government |
| Federal | Request to Federal Government |
| INT | Request for information on non-U.S. government |
| Local | Request to a local government |
| Multiple | Request that can be from multiple levels |
| NA | Can't tell from information |
| School | Request to a school board |
| State | Request to a State Government |

*Table 4. High-level request*

| Code | Description |
|---|---|
| Forms | A request for forms |
| Information | A request for basically information |
| Multiple | A request for multiple things |
| Services | A request for services |

*Table 5. Applicable to*

| Code | Description |
|---|---|
| Business | A commerce request |
| Citizen | A request for information of interest to a citizen |
| CT | Can't tell |
| Multiple | A request that may be from multiple stakeholders |
| Non-citizen | A request of interest to a non-citizen |
| Other | |

*Table 6. Mid-level request*

| Code | Description |
|---|---|
| Art | Information on some overall aspect of government |
| Bus_With | Non-citizen--doing business with U.S. |
| Financing | Business |
| Health | Citizen |
| Hr | Business human resource |
| Job | Citizen |
| Law | Multiple |
| Management | Multiple |
| Multiple | Request for multiple things |
| Org | Looking for a organization of government |
| Policy | Multiple |
| Regulations | Business |
| Seniors | Citizen |
| Start-up | Business start-up |
| Taxes | U.S. citizen |
| Tech | Multiple--technology |
| To U.S. | Non-citizen--coming to U.S. |
| World | Non-citizen--coming to U.S. |
| Youth | Citizen |

*Table 7. Low-level request*

| Code | Description |
|---|---|
| Forms | Specific type of form |
| Stats | General stats about U.S. |
| Info | General information about government |
| Policy | Specific policy |
| Courts | General information |
| EDU | Education |

# Human Factors in Public Information Systems

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## INTRODUCTION

News reports do not frequently mention many problems or accidents caused by human error. The specialty of human factors seeks to avoid human error by making certain that computers and all other equipment are designed to be easy to understand and use; costly human errors are thus minimised. This article provides a basic overview of the subject of human factors as it pertains to problem and error avoidance in computerised public information systems. When computer/system design does not adequately consider human capability, the performance of the computer/system and the user will be below desired levels.

## BACKGROUND: HUMAN FACTORS, THE DISCIPLINE

Human factors has helped to make information systems less costly and easier to use. Some background on this discipline will help to show the relationship it has with information systems.

Human factors is the science of the relationships between humans, their activities, and the context in which those activities take place. The specialty of human factors came into being during WWII when it was found that the sophisticated equipment being designed did not perform as expected; there was a strong and immediate need to understand why many humans were unable to effectively use equipment and/or systems. Teams of researchers learned that the design strategies used did not consider human performance limitations—for example, some designs presented too much information at the same time or in the wrong order for humans to be able to successfully operate controls. Or, the arrangement of controls made them difficult to reach quickly and easily. From this discovery came the concept that *human* users, their work *activities,* and the *contexts* of the activities had to be thought of as different parts of a whole system and that each depends upon the other for successful operation (Bailey, 1996).

After WWII the discipline of human factors became a specialised knowledge area as it became apparent that the human element of any system had to be considered if the capabilities of new technologies were to be efficiently exploited. The older strategy of modifying designs over a long period of time through user experiences was inadequate; rates of change had become so rapid that products were obsolete before improvements could be added. Now, the strategy often used by successful design environments is to include human factors in design and development. When properly managed, products or systems that use human factors knowledge are more efficient, safer, and more pleasing to use because they are designed to accommodate human performance capabilities (Norman, 1988).

Human factors is an extremely broad technical and scientific discipline; founders of the first national and international human factors organisations came from such diverse fields as engineering, design, education, computer technology, psychology, and medicine. Through its diversity human factors is able to draw upon and combine knowledge from any area when working with human and system performance issues. Due to the complexity of human behaviour, human factors specialists emphasise in their work an iterative empirical approach. First, an initial recommendation or interface design is made and then laboratory or field studies are conducted to test this initial design (the prototype). Changes are made when deficits are identified; modifications are made; and further testing is then performed. This process continues until significant problems are no longer found. Finally, validation is achieved through observation in the field after system deployment.

This emphasis on empirical work tends to shape how human factors specialists perform their roles. Irrespective of the specific methodology chosen for gathering data about tasks, users, and the use of products, human factors work tends to result in product improvements likely to be economical, easy, and efficient to use from the beginning of use; the cost of and need to go back and fix problems when human factors is not used is avoided.

Human factors can also be called ergonomics. As the term “human factors” is in more common usage in the computer field, it is used for this article.

## Human Factors and Computers

As with other technologies, WWII helped to stimulate the development of computers. The first models of computer used to manage information were primitive in comparison to the computers of today. They were designed by scientists and engineers to be used by scientists and engineers. These computer systems were difficult to operate and had to be closely watched during operation; users had to understand the technology for successful operation and tolerate problems, as technology-advanced computers became easier to operate. With today's systems, the typical user does not need to understand technology; what is important is that a user understands how to tell a computer exactly what information is needed.

This progress in computer technology means that average users of computers and information technology (IT) are no longer just scientists or engineers; instead, they can be anyone who understands how to operate the computer information system they are using. While computer and IT systems are much easier to use, this does not mean that there are not challenges faced. When working with information stored electronically or operating something with the help of a computer, problems can occur when a user misunderstands information presented to them, or they fail to correctly tell the computing system what is wanted. Literature on computers and electronic technology describes instances where there were serious negative consequences when information presented by a computer was misunderstood or systems were mistakenly told to do something different than what was wanted. The shooting down of Korean Airlines flight 007 in 1983 demonstrates some of the problems that can occur between the operator and a computer. Before take-off a crew member entered wrong data into an on-board computer. A warning was ignored as it appeared to be caused by another factor other than the entry of incorrect data. Subsequently the incorrect data caused the pilot to fly off course and into a sensitive area where the aircraft was shot down by a missile. Had the system been designed differently, so that the human activity context was better considered, then it would be likely that a tragic chain of events would not have been started.

To prevent such events from occurring, an emphasis on understanding how to design systems, where it is difficult for people to make mistakes or misunderstand, has emerged as a specialty within the field of human factors. The concept of *human-computer interaction,* or HCI, as a specialty within human factors emerged. In simple terms, HCI is the search for ways to make computers and complex information services accessible, usable, and acceptable to the non-specialist user.

At first, the emphasis of HCI was on physical aspects such as the size, location, and qualities of computer screens and controls. How people think when using computing and IT systems was added as it became more and more evident that how users think and understand is extremely critical in computer design. The subspecialties of *cognitive engineering* and *usability* followed—the former concerns understanding how people think when understanding systems, and the latter concerns how well people can understand and use systems.

Human factors and its related disciplines are now recognised as an important part of the computing system design process. Most computer and related system design approaches try to consider the needs and capabilities of users. With new products and technologies constantly entering the market, new problems are continually encountered—this underscores a continuing need to address human factors when designing computers and computing systems (Cooper, 1999).

The migration of paper-based forms to computer-based public information systems is the type of problem now faced. Work currently in progress in Sweden has found that the way a form looks on paper cannot be used on a computer screen. A computerised system had been developed that used exact copies of paper forms on computer screens. User error rates were extremely high, and the computer system was more costly to operate than its paper-based predecessor. The computer system had been designed without involvement of human factors specialists. Human factors specialists were asked to help correct system problems. The initial results of the human factors assessment reduced error rates and costs; work continues to bring performance to a desired level. The human factors specialists questioned and observed users. From those, it was possible to identify simple solutions to performance problems.

## Public Information Systems, Computers, and Human Factors

Since public and private information systems use the same technology and function to exchange information between users and systems, is there any difference between the two? Should they be treated differently? Do the two have different needs?

Questions about difference and how human factors is connected are perhaps best answered by looking at the populations served and the reasons for the creation of any particular system. Private information systems generally serve segments of entire populations (exclusive) and make little or no attempt to accommodate those who lack needed skills. In contrast, public systems must at least have the goal of being usable by every member of a population (inclusive). The exclusive nature of private information systems means that during development and

design there is a focus on meeting the needs of a target group that is part of an entire population. In contrast, public information systems generally must be developed and designed to at least have the goal of accessibility to an entire population. A second major difference between the two is that private information systems are oriented towards generating at least enough revenue to meet expenses, while public information systems are oriented towards providing service (which may or may not generate revenue).

While these differences may be subtle in some circumstances (e.g., a system used by a private, non-profit organisation or a system used by a fee-based public entity), it can be argued that, in some form, an inclusive or exclusive orientation is present.

How is this difference important with respect to human factors and public information systems? It is important because public information systems must be designed to be usable by the public—which includes everyone in a population. The goal of accessibility to an entire population means having to design for all levels of computer skills, education, and ability. A private information system is designed to be used by persons who are already familiar with computers and, if specialised knowledge/skills are needed, training is provided.

Any entity responsible for a public information system benefits from incorporating human factors knowledge and skills into any information system development or operation. The multiple levels of needs of users make understanding this diversity essential. Without human factors there is a much higher risk that the best design alternatives will not be found and selected—such as trying to move from paper forms to computer-based forms without considering the differences between entering data on paper and entering the same data onto a computer screen. As described in greater detail in the following section, human factors practices make certain that people can easily understand and use a system.

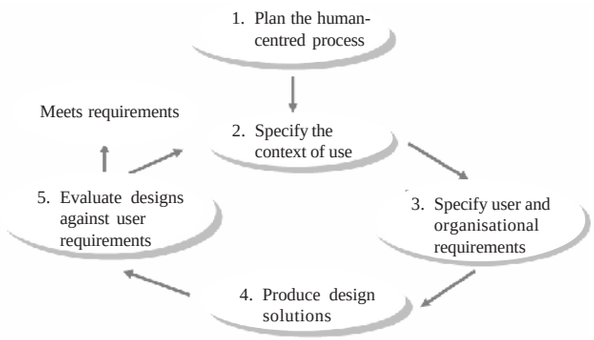
## HUMAN FACTORS AS A KEY ELEMENT IN PUBLIC SYSTEM DESIGN

Including human factors in the earliest stages of any design process ensures that a product is defined in terms of user needs. Human factors input at these stages also helps project management to redirect resources to approaches that are most likely to have the greatest user benefit. Human factor specialist involvement throughout design processes results in catching problems early on; thus helping to reduce overall project costs. Finally, the ability to anticipate user responses continues to improve as successive prototypes more closely approximate the final product and actual field conditions. During design and development processes, human factors specialists base user interface and system design recommendations on an understanding of user needs, goals, characteristics, and expectations. Systems designers then work with human factors specialists to translate these stated needs into specific technical design requirements that may be implemented within cost targets. As noted earlier, the human factors specialist can work with public information system development and design processes to balance usability requirements with user constraints, system requirements, and development costs. The result can be that the final product functions as desired and in ways that are easily usable (Bailey, 1996).

## PLANNING FOR HUMAN FACTORS DURING PUBLIC INFORMATION SYSTEM DEVELOPMENT

Information systems' planning is a common problem for organisations, and planning for human factors is a particular problem within the overall problem of design (Kuark, 1996). The traditional approach to planning IT systems is called the systems development life cycle (SDLC) method (Davis & Olson, 1985). This approach can be summarised as a linear checklist of activities undertaken in a series of phases that begins with planning and ends with system termination. To put it another way, SDLC is a planning process that separates an IT system problem into its constituent parts, treats each step separately, and then unifies the parts into a whole at the end (Langefors, 1973). This approach has been criticised as too concentrated on technology at the expense of users and product performance (e.g., Noyes et al., 1996). To keep the valuable parts of the SDLC method there is a movement to integrate human factors into SDLC (Zhang, Carey, Te'eni, & Tremaine, 2005). Whether integrated in with SDLC or another methodology, HCI development and design is the process of creating quickly all or part of a system in the form of a simulation or prototype (e.g., on paper or a nonworking sample displayed on a computer screen). The advantage of this method is that it allows user feedback early enough to accommodate major structural changes before extensive development investments are committed. This use of prototyping is a team process which helps to overcome the limitations SDLC. The early SDLC model has been described as too linear, lacking a group planning orientation and not an actual reflection of real world conditions (e.g., Wanninger & Dickson, 1992). Now the emphasis is on using the systematic features of SDLC

*Figure 1. UCD process model (from ISO 13407, 1999)*




from a human factors perspective; technical decisions are based on an understanding of human needs and capabilities (e.g., Zhang et al., 2005). The following section on user-centred design describes the most commonly used model promoted by human factors professionals and user-oriented designers.

## USER-CENTRED DESIGN

User-centred design (UCD) refers to the design of interaction between users and the system, called *interaction design* (Preece, Rogers, & Sharp, 2002). It models a system from a user perspective and focuses on the usability of an interactive software system. The core objective is to effectively support users in executing their tasks (Earthy, 2001).

*Usability* is recognised as one of the most important quality characteristics of software intensive systems and products. Usability gives many benefits including "increased productivity, enhanced quality of work, improved user satisfaction, reductions in support and training costs and improved user satisfaction" (ISO13407, 1999).

The prevailing paradigm of developing *usable* products and systems (or UCD) is that usable products are created through processes of user-centred design. The UCD process model is illustrated in Figure 1. Achieving quality in use requires this type of user-centred design process and the use of appropriate usability evaluation techniques. Usability is defined as a high level quality objective: to achieve effectiveness, efficiency, and satisfaction. This requires not only ease of use but also appropriate functionality, reliability, computer performance, satisfaction, comfort, and so on.

### UCD and Usability

The role of UCD in a development effort is to deal with user needs in a way that highlights potential problems and ensures that products, systems, and services will succeed because they are based on appropriate UCD and usability. The applied discipline of cognitive engineering leans heavily on the knowledge and methods developed by human experimental psychology and, to a lesser extent, on applied physiology and related human sciences to carry this goal out.

### Usability Facilities

Usability laboratories have become an important tool. These laboratories, together with appropriate field-kit evaluations, enable us to meet the growing number of requests for usability support, chiefly user-based evaluations of development prototypes and competitors' products. Together with the appropriate development processes, laboratory studies help predict and deal with specific usability problems during product development. Such a laboratory also provides an extremely powerful tool to identify and publicise general usability issues that affect overall product use. Rubin (1994) describes usability testing in detail and gives examples of typical usability laboratories.

## IMPLEMENTATION ISSUES

Although improved technology will always have a critical role in system design, it is often the case that human factors considerations will take up the majority of the time of IT designers and managers. Much is known about the nature of human error, the conditions that encourage error, and hardware/software designs that are error resistant (Norman, 1990), and much of this is now well recognised in IT training literature (Salvendy, 1997). While human factors is recognised and used by many information system developers and designers, there are those who take the perspective that users who want access must accommodate themselves to an information system.

The attitude of the employees' response for administering a public information system is also critical for success. New users or those with problems may need to ask an employee (a human-human interface) for help. Employees who have a negative attitude will too often give the user a negative attitude towards the system (Cialdini, 1993). Including employees in processes will help to avoid the problem of employees undermining the operation of a

public information system; following are some points to use in the avoidance of employee resistance.

## Cognitive Aspects of Implementation

Overcoming employee resistance is a problem in cognitive change. Human factors texts and reference books describe how computerisation alters the flow and content of information, changes job content, or affects relationships between organisational members (e.g., Bailey, 1996; Dix, Finlay, Abowd, & Beale, 1998; Helander, 1997). A key finding was that the primary issue was not computing itself, but rather perceptions of the method of implementing it. It is precisely in this area that human factors become important by including assessment of organisations during public information system changes.

## Cognitive Perception

In IT projects there are four common cognitive perceptions that must be overcome by employees: (1) automation is mandated arbitrarily; (2) the new computer system will be unreliable; (3) the new system will increase rather than decrease the work burden; and (4) they (employees) will neither understand a system nor be able to operate it. Free and open communications throughout an IT implementation process is an important avenue for reducing employee resistance coming from these issues. Negative perceptions regarding the introduction of IT may be overcome to a significant extent through the encouragement of employee decision making during an IT introduction process.

## Attitudes

Although user attitudes tend to be against change, once new technology is seen as bringing desired benefits, attitudes will begin to adapt. In particular, acceptance is much more likely when computing is presented as complementary to human skills, enhancing rather than replacing them (Petheram, 1989; Rosenbrock, 1981). Changing employee attitudes is all the more important since word of mouth is a critical aspect of the process by which technological innovations are spread (Czepiel, 1974). Dickson, a pioneer in the study of human relations and IT noted that, when it comes to management information systems, it is essential to involve people as a component, knowledge of their behaviour as a part of the system is important to the success of the entire field (Dickson, 1968).

The human factor in IT involves both teamwork and leadership. If a leader attempts to bring about IT change in an authoritarian manner, the result may be resistance, lack of effectiveness, and even outright failure. On the other hand, if a leader is able to mobilise the cognitive pressure of professionalism in favour of IT change, then an organisational culture of acceptance is possible (Prasad & Prasad, 1994).

# FUTURE TRENDS

When considering the future of human factors in public information systems, it is useful to first recognise that an astonishingly rapid rate of technological change has been and is the norm for computing systems. Whole buildings and highly trained teams were once needed for a single computer; in contrast, more powerful systems can now be found on the top of the desk of the least-skilled person in an organisation. Given this rapid and dramatic pace of change and development, it is challenging to predict future directions.

Despite this dramatic pace which defies the imagination it is possible to observe that whatever technology may bring the core emphasis of human factors will remain unchanged. For any technological change to be effective, it must be readily understandable and usable by an average user. For example, while nearly instantaneous processing and presentation of data is becoming the norm, that data are of no value if confusing or overwhelming.

Any future system, regardless of any technological advance it may achieve, must include in its design consideration how humans comprehend, manage, and process information. For example, Miller (1956) reported that the average person is unable to remember more than seven pieces of information at one time. A computing system that requires that a user remember eight pieces of information to successfully complete an operation will therefore have high rates of user error. It is this kind of simple, yet critical, understanding of human capability that must always be included in design.

Thus, technologies and designs of the future will always need to include recognition of human limitations in any interface design. Toolkits that contain information about human capabilities will make it possible for researchers and designers to consistently include consideration of the human user in any final product.

# CONCLUSION

New technologies are often seen as an ultimate solution. While this is essentially correct, it is also necessary to recognise that improved technology does not change human capability. Computers and computing systems, as with public information systems, can only be as effective as users are capable. Designs that expect users to learn to perform beyond usual capabilities ignore the reality that

humans are limited and unlike technology, cannot be improved or upgraded. For this reason it is essential that the concept of user-centred design be part of any public information system design process.

As implied, the introduction into IT system development of user-centred design procedures ensures that success stories associated with usability engineering will continue. Advanced development projects that examine psychological factors underlying consumer reactions and expectations include user-centred evaluations of prototypes and match human capabilities with system designs. These are most likely to result in public information systems that are accepted by both the public and governmental employees.

The inclusion of human factors into public information system development and design processes will, over the life of a system, reduce costs through the avoidance of the need to correct problems caused by errors or through difficultly in using the system. To successfully achieve this integration strong leadership that requires human factors elements in a system is necessary. Strategies such as specifying ISO 13407 (1999) as the standard during development and design are recommended as a way to be sure that human factors will be included.

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## KEY TERMS

**Cognitive Engineering:** Understanding and predicting how changes in a task environment will influence task performance.

**Human-Computer Interaction (HCI):** The study of people, computer technology, and the ways these influence each other (Dix et al., 1998).

**Human Factors (or Ergonomics):** The scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design in order to optimise human well-being and overall system performance (IEA, 2005).

**Interface:** A point in any human-computer system where information is exchanged. Interface designs that do not take into consideration human capabilities will likely have higher than desirable rates of human error.

**Usability:** The effectiveness, efficiency, and satisfaction with which specified users can achieve specified goals in particular environments.

**User-Centred Design:** During the design of systems or products the capabilities of end users (humans) are considered so that the final system or product is readily usable and designed so that the likelihood of error is minimised.

**User Interface:** The way that a human and computer system exchange information. Both hardware and software are part of the user interface. The screen, keyboard, and mouse are the most common hardware combination; any other hardware design that can be used to exchange information is also a user interface. The software arranges the information (e.g., sequence, quantity, manner requested, etc.). Human factors focuses on making certain that information is presented in a way that facilitates understanding.

# ICT as an Example of Industrial Policy in EU

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## INTRODUCTION

A substantial part of the economic growth that has taken place within the past 2 decades is related to information and communication technology (ICT). First, the ICT sector itself has achieved very high growth rates. Second, productivity gains in other sectors have been achieved, to a large extent, through implementation of ICT-related innovations. It is, therefore, no surprise that ICT plays an important role in virtually all industrial policy programs. Policies stimulating e-government are one of the ingredients in such programs.

In 2000, the leaders of the European Union (EU) adopted the Lisbon strategy to make the EU the most dynamic and competitive knowledge-based economy in the world (CEC, 2000). ICT was seen as a key component in achieving these goals[1], and a special program—eEurope—has been designed to realize the Lisbon goals in the ICT area. This program is, however, also a continuation of a wide range of ICT initiatives taken by the EU Commission since 1984.

## BACKGROUND

In the eEurope program, the Commission mentions three types of benefits stemming from ICT:

1. The ICT sector itself accounted for 6% of employment in the EU in 2000
2. ICT improves productivity in other sectors
3. ICT boosts citizenship and quality of life (CEC, 2004a).

Although the third point may, in part, be outside the scope of industrial policy, as it does not directly address the economic sphere, the three points reflect very well the dual aspect of the EU ICT policy, which has been inherent from the early beginning:

- **International Competitiveness:** Telecom is considered to be a high-tech sector of strategic importance with regard to the generation of employment and economic growth. In addition, telecom is a sector in which the EU has a relatively strong position compared to the United States (U.S.) and Japan.
- **The Information Society:** Telecom networks constitute an essential infrastructure for the information society. Cheap and ubiquitous access to advanced telecom services is, therefore, important for the generation of employment and economic growth in any industry.

The first point is typical for sector-specific industrial policy. The objective is to strengthen an industrial sector deemed to be of particular importance to maintain or even improve the EU position in the international division of labor. The major reason is a high growth potential with regard to employment and contribution to GDP.

The second point is somewhat more related to horizontal industrial policy aiming at improving the business environment in general. Here, ICT is seen as a part of the overall infrastructure used by all industries. It should be noted that this distinction is not completely clear-cut. The argument for industrial policies directed towards a specific sector will often be that a particular sector possesses important spillovers to other industries. For instance, one of the arguments used as justification for the support to the agricultural sector is that agricultural production generates employment in food-processing industries.

The telecom sector itself has often used its importance for the entire economy as an argument for support. This argument has also been widely used by other sectors if they had an interest in affecting political decisions. However, with regard to telecom, there has also been a strong pressure from users—in particular, business users—depending on access to more advanced communication services.

A strong ICT sector may support the development of an information society, and an advanced information society will benefit the ICT sector as it stimulates demand and innovation of ICT products and services. Still, the two objectives are addressing two different groups—users

and producers of ICT—and these groups often have contradicting interests.

## THE EU RESEARCH PROGRAMS

The first initiative taken by the Commission was the introduction of a number of European-wide research programs. The ESPRIT program supporting IT research was commissioned in 1984 and the first phase of the RACE program, supporting telecom research, was commissioned the year after. Both programs offered support for so-called pre-competitive research. In this way, any accusations of industry subsidies could be avoided, and it was easier for competing companies to exchange information. The core of the RACE program was to develop technologies for developing a broadband in Europe (a distant goal at that time), and the focus was mainly on providing the basic infrastructure, although very few applications justifying the need for huge investments in optical networks were available. An important objective of the program was also to create an international forum for discussions and cooperation between European telecom companies to establish a common vision for the future European telecom networks and, thereby, facilitate integration of a market fragmented along national borders.

The RACE program was extended and followed by a series of other telematic research programs. However, there has been a gradual shift in focus from development of basic technologies towards development of applications. This reflects a trend towards more application-oriented research as well as a shift towards more focus on the demand side. Also, the kind of participants in the research programs has changed. From the beginning, telecom operators were very active in the programs, but following a reorientation of the telecom operators towards more commercial—and more limited—research and development activities, they have restricted their participation. On the other hand, a large number of small- and middle-size consultancy firms and information technology (IT) companies have engaged in the programs.

## STANDARDIZATION

A related activity was the establishment of a European standardization body, ETSI. The creation of this body moved a part of international standardization from ITU into the European framework. In addition, it enabled a more direct involvement from industry partners in the standardization process. Many of the EU-funded research projects participate directly in ETSI so that the research made through cooperation between European industry actors can result in common European standards.

The establishment of a European-based standardization body is not only a way to contribute to the development of a common internal market within the EU. It also contributes to strengthening the role of the EU-based industries in the formation of global standards, and thereby it contributes to an improved international competitiveness of the European telecom industry.

## SECTOR REFORM

Another line of EU policy has been related to the market reform of the telecom sector. This reform was initiated by the Green Paper issued in 1987 (CEC, 1987) and followed by a series of directives that have been revised a couple of times. The latest major revision was made though the issuing of the new telecom framework directives in 2002. The vision behind the market reform is to change the telecom sector from being a public utility provided by publicly owned—or at least publicly controlled—monopolies into a "normal" industry sector, where private companies compete for market shares and without any sector-specific regulation.

Although the sector reform should be seen in the context of an ongoing reform of public sector activities in general, the primary objective is to initiate a more dynamic development of the telecom sector itself through a complete restructuring and to remove barriers set by former public involvement. It should, however, be noted that the objective of "normalization" of the sector was not clearly defined from the beginning. The first step, which was suggested in the Green Paper, was the liberalization of terminal equipment, creating a common market in this area. The Green Paper of 1987 also suggested a liberalization of other telecom services than telephony, while telephony, which at that time was by far the most important service, as well as the physical network, should be reserved for the incumbent monopoly operators.

A further point is that not all member countries agreed on the proposed liberalization. In particular, France, together with countries from Southern Europe, were very reluctant to liberalize the telecom market, and many countries were concerned about how their own incumbent telecom operator could survive in a liberalized market. A good example of this is Denmark, where the market was divided between four regional operators in limited geographical areas. The Danish government wanted to create a strong Danish actor on the telecom market and merged all operators into one (Tele Danmark). In addition, a substantial part of the revenue raised through the subsequent privatization was given to Tele Danmark, enabling the company to invest in telecom companies abroad.

A more recent line of policy actions is related to the stimulation of demand and development of content. These types of initiatives dominate the eEurope program initiated for realizing the goals set by the Lisbon agenda with regard to ICT. The objectives of the program do not include anything about the ICT sector itself, but focuses on making ICT available to everybody and stimulating entrepreneurship.

## eEUROPE

The eEurope program was initiated in 2000 as a Commission initiative for the special European Council of Lisbon (ECE, 2000). The program has later been followed by the eEurope 2005 program (CEC, 2002a), and the successor of this program—i2010—has just been announced (CEC, 2005).

The eEurope plan 2000-2002 had three overall objectives: Cheaper, faster and more secure Internet, investment in people and skills and greater use of the Internet. In the eEurope 2005 plan, these aims were replaced with: Modern online public services, dynamic e-business environment, widespread availability of broadband access and secure information infrastructure (CEC, 2003). Both plans include actions stimulating network as well as content development.

This dual perspective is most clearly formulated in the 2005 plan, where the mutual dependence between network development and content development is recognized and public action is recommended to correct this market failure: "Funding more advanced multimedia services depends on the availability of broadband for these services to run on, while funding broadband infrastructure depends on the availability of new services to use it. Action is, therefore, needed to stimulate services and infrastructure to create the dynamic where one side develops from the growth of the other" (CEC, 2003, p. 2).

This is the typical market failure argument used for implementing industrial policy: To achieve the most favorable development, it is necessary to help the market to take the right decisions.

Both plans include a large number of action points, but none or very few of these points include initiatives that would be termed as industrial policy in the supply-oriented, traditional sense. However, they include the development of a wide range of e-government applications, such as e-learning and e-health, and the provision of broadband access to public institutions. Development of such applications enables both cost saving and service improvements in the public sector. But maybe even more important is the impact on other sectors. Development of e-government services stimulate development of similar service in the private sector and lead to further growth in the demand for infrastructure facilities, such as broadband. eEurope also includes a large number of initiatives involving the private sector. These initiatives include support to research and development in telecom networks as well as applications like e-business. The objective of many of these initiatives is to develop pilots, which can inspire other parts of the private sector. Finally, the plans include a continuation of the telecom reform process and measures for improvement of legislation to facilitate e-business.

Although the 2005 plan states the importance of the supply side, the only really new initiative, in addition to a continuation of the telecom reform process, is a suggestion to finance network development in less favored regions; for example, by the use of structural funds. This initiative is maybe the one most in line with the old-type industrial policy subsidies.

In addition to initiatives at the EU level, most member countries have defined their own national broadband strategies as a part of eEurope. National programs within the ICT area are far from a new phenomenon. In the early 1990s, it became fashion for each country to develop its own plan for how it could become global champions in ICT (Henten, Falch, & Skouby, 1995).

The national programs fit very well with the EU programs, as they basically use the same type of remedies: Support for research and development and pilot projects, e-government initiatives, and demand stimulation through demand from public sector institutions. Very few countries have discussed direct subsidies for network development. Sweden has had programs for public funding of broadband networks, and in Denmark, broadband access receives substantial taxation subsidies, as companies are allowed to offer broadband connections to their employees as a tax-free fringe benefit.

## FUTURE TRENDS

The eEurope and iEurope programs tend to emphasize more on content development and stimulation of demand than previous ICT programs. The same trend can be observed in other countries; for example, in the Japanese U-Japan program. One reason for this is that the major parts of telecom reform now have been implemented and the supply of network infrastructure no more is seen as a major bottleneck for development of the information society. Therefore, more attention is given to development of content. In this context, e-government plays a major role, as development of public content can stimulate development of content in the private sector as well as the demand for ICT network facilities, such as broadband.

## CONCLUSION

During the process of creation of the EU internal market, it has been important to remove all barriers for international trade between member states. This includes national subsidies as well as other measures favoring domestic industries. On the other hand, it has been important to ensure development of the European industry in competition with the U.S. and Japan. This has led to a strategy with policy goals that are not very different from those set by traditional national industrial policy; but at the European level, many of the traditional remedies are replaced by a new set of initiatives with focus on stimulation of ICT-based innovations and applications. In this context, e-government plays a crucial role, as development of public e-services stimulates the overall use and demand for ICT. The impact of such policies on the entire economy is difficult to assess. But there has been a clear, positive impact on the penetration of ICT technologies in the countries being most active in this policy area. In particular, policies securing more competition on national ICT markets led to a much faster introduction and higher penetration of new ICT services, such as broadband access and mobile communication.

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## KEY TERMS

**eEurope:** The eEurope program was initiated in 2000 as a part of the Lisbon Process to ensure that the EU will fully benefit from opportunities of the information society. The objectives are to make communication services including broadband widely available, to stimulate content development and improve e-literacy—all in a way that strengthens social cohesion.

**ETSI:** ETSI is a European standardization body established following an initiative set by the European Commission. ETSI prepares common standards for telecommunication systems for fixed and mobile networks and services, TV broadcasting as well as for information technologies. Both European and non-European companies can be members. Today it has 688 members from 55 countries.

**EU Research and Development Programs in ICT:** European research activities are structured around consecutive 4-year programs, or so-called Framework Programs. The Sixth Framework Prograe (FP6) sets priorities —including the information society technologies (IST) priority—for the period 2002-2006. While the first cycles mainly focused on the basic technology, later programs include a wide range of applications as well. The current program includes a project line on ICT research for innovative government.

**Industrial Policy:** State policies conducted with the aim of strengthening the industrial base of a country or region. General macroeconomic stabilization policies are not considered part of industrial policies; however, industrial policies can encompass a broad range of supply-and-demand-oriented policy initiatives.

**International Telecommunication Union (ITU):** An international organization within the United Nations system where governments and the private sector coordinate global telecom networks and services.

**Lisbon Process:** At a summit in Lisbon in March 2000, European leaders set the goal of the EU becoming "the most dynamic and competitive knowledge-based economy in the world" by 2010. The target was a 3% average annual economic growth and the creation of 20 million jobs by 2010.

**Telecom Sector Reform:** A reform that has transformed the telecom sector from national monopolies controlled by governments to a sector with competition and private ownership. The telecom market was in principle liberalized in 1996 within the U.S. and in 1998 within the EU, although public ownership of telecom operators still persists in some European countries.

## ENDNOTE

[1] See EU Web site for more information on Lisbon agenda: http://europa.eu.int/growthandjobs/index_en.htm

# ICT Considerations for a Municipality in South Africa

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## INTRODUCTION

The availability of publicly accessible Internet networks and services are the first prerequisite in ensuring that all citizens and nations can benefit from information on the World Wide Web (UNESCO, 2003). Information and communication technologies (ICT) are playing an increasingly important role in the daily lives of citizens, revolutionising work and leisure and changing the rules of doing business. ICT encompass all technologies that facilitate the processing and transfer of information and communication services (United Nations, 2002). In the realm of government, ICT applications are promising to enhance the delivery of public goods and services to citizens not only by improving the process and management of government but also by redefining the traditional concepts of citizenship and democracy (Pascual, 2003). The spread of ICT brings hope that governments can transform (Pacific Council on International Policy, 2002).

This article is organised as follows:

- Background to the research is given
- ICT adoption in the eThekwini Municipality in South Africa is described
- The research goals, method, data gathering, and results are discussed
- Management implications towards implementing a successful e-government strategy are given
- Future trends are then suggested and a conclusion is given

## BACKGROUND

Electronic service delivery (ESD) is a method of delivering services and conducting business with customers, suppliers, and stakeholders to achieve local government developmental goals of improved customer service and business efficiency. The eThekwini Municipality in South Africa sees the e-government strategy (Ethekwini Municipality Integrated Development Plan 2003-2007, 2003) and its Web site at URL http://www.durban.gov.za as important management tools for improved citizen service delivery and communications. The ultimate objectives of this Web site are to make most of Durban's over-the-counter services available online, assisting people to find a wide range of information about local governance online and marketing the city to tourists and business people (eThekwini Municipality Portfolio of Sustainability Best Practice, 2004).

An editorial in the *South African Business Day* on August 26, 2003 reports that the City of Durban on the east coast of South Africa in the eThekwini Municipality Area (EMA), is quietly installing one of the largest networks in the country to link up scores of municipal centres all over greater Durban. The more technologically savvy can already access a wealth of city information via the Internet, by browsing the Web site either from home personal computers (PCs) or an increasing number of Web-linked computers at municipal libraries. The editorial states that Durban "is also pumping tens of millions of rands into promoting the local technology sector." It is against this background that research was conducted to glean a clearer understanding of the implication of ICT for e-government adoption in the EMA.

## ICT ADOPTION IN THE eTHEKWINI MUNCIPALITY AREA (EMA) OF SOUTH AFRICA

eThekwini Municipality's population is 3.9 million citizens (Statistics South Africa, 2001). The population is an amalgamation of racial and cultural diversity. The black African community is comprised of 68.3%, coloured citizens 2.8%, Asian citizens 19.9% and white citizens 9% (Statistics South Africa, 2001). Thirty-eight percent of the population is under 19 years of age (Ethekwini Municipality Integrated Development Plan 2003-2007, 2003). Ethekwini Municipality has a capital budget of ZAR2.70

billion (approximately U.S. $0.40 billion) and an operating budget of ZAR9.64 billion (approximately U.S. $1.45 billion) for the 2005/6 financial year—visit URL http://www.durban.gov.za. Durban is South Africa's major port and the second largest industrial hub after Johannesburg. The EMA's gross geographic product income is ZAR25,529 (approximately U.S. $3,838) per person, per annum which is higher than the South African average of ZAR17,756 (approximately U.S. $2,670) per person, per annum.

Erwin and Averweg (2003) report that there is a need for organisations to adapt to constantly changing business conditions. The Ethekwini Municipality: Quality of Life Household Survey 2002/2003 (2003) reveals the needs and problems impacting the quality of life of EMA citizens. Some issues raised include new housing requirements, water and sanitation supply and lack of recreation facilities (Ethekwini Municipal Area Development Profile, 2002). This survey reveals that there is also a growing need for information in the EMA. Among the solutions to fulfil this need, ICT is seen as an effective mechanism to access municipal information in particular and development information in general. As reflected in the "Results and Discussion" section in this article, most EMA citizens receive municipal information via a municipal magazine (*MetroBeat* publication which is published monthly by the Communications Department, eThekwini Municipality) delivered to their post box. However, from the authors' survey, EMA citizens indicate that they would like to receive information via the electronic information exchange mechanism in the form of the Internet.

There is a growing number of EMA citizens accessing the eThekwini Municipality Web site through other initiatives (e.g., Carnegie E-Community project aims to improve the quality of life of municipal citizens and access to information by placing computers in municipal libraries). South African Web sites, which seek a local and global reach, have to cater for the digital divide which exists between the technological "haves" and "have nots" (Averweg, Barraclough, & Spencer, 2003). The mere existence of gaps in levels of ICT practices between rich and poor across and within countries is not an automatic reason to argue that ICT should be placed near the top of the development agenda (Manyanga, 2002). In looking at the difference in access between developed and developing countries, Gumucio-Dagron (2003) notes that the "divide has never been only a 'digital' or technological divide. It is a social, economic, and political fracture." The authors suggest that a comparable situation exists (in microcosm form) in the EMA. Bridging the digital divide in the EMA is not the end in itself. It is not even the beginning of the end. The authors suggest that perhaps it is the end of the beginning to bring positive changes in the development of a municipal information society.

## E-Government and E-Governance

E-government is about transformation that helps citizens and businesses find new opportunities in the world's knowledge economy (Pacific Council on International Policy, 2002). Governments have not been immune to the impact ICT have in society (Rivera-Sanchez & Sriramesh, 2003). Governments that define e-government as simply moving services online "miss larger opportunities which [will] determine competitive advantage in the long run" (Caldow, 2002). Definitions of e-government range from "the use of information technology (IT) to free movement of information to overcome the physical bounds of traditional paper and physical based systems" to "the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees" (Deloitte & Touche, 2003). Ultimately, e-government aims to enhance access to and delivery of government services to benefit citizens (Pascual, 2003). E-government needs to find a positive developmental role. Without this, e-government runs the risk of being a 21st century "rusting tractor," cast aside as it fails to fulfil its promise (Heeks, 2003). E-government services focus on four main customers: citizens, the business community, government employees, and government agencies. The focus of this article is on citizens in the (local government) EMA.

E-governance refers to a local government's inventiveness to electronically govern areas under its jurisdiction (Manyanga, 2002). This effectively means the public sector's use of innovative ICT (e.g., Internet) to deliver to all citizens improved services, reliable information, and greater knowledge in order to facilitate access to the governing process and encourage deeper citizen participation.

## Research Goals

ICT can be defined as electronic means of capturing, processing, storing, and communicating information (Heeks, 1999). E-readiness can be defined in terms of availability of ICT infrastructure, the accessibility of ICT to the general population and the effect of the legal and regulatory framework on ICT use (Manyanga, 2002). In building a model of ICT, two separate elements exist: the technology itself and the information on which it operates. Heeks (1999) suggests that in order to make this model useful, two further processes should be added: processes of purposeful activity and the people to undertake those processes. Together these constitute an "information system," such as a support system that helps citizens interact with their local municipality. The authors suggest that the harmonious development of a

municipal information society is only possible if the availability of multilingual and multicultural information is encouraged.

Ethekwini Municipality embarked on an initiative to understand the needs of its users and non-users in utilising ICT as a tool to improve service delivery and establish effective communication between itself and its constituencies. Prospective techniques help practitioners work on an e-government project that is still at the planning stage (Heeks, 2003). This article reports on these initiative findings from a survey conducted and suggested management implications that relate to the adoption of an e-government strategy in the EMA. With the high failure rate of e-government projects, Heeks (2003) notes that it carries direct and indirect financial costs, it damages morale, credibility, and trust, and it prevents the benefits of e-government from being delivered. The focus of this article is on citizen's capabilities to use ICT to acquire or share information with the municipality and general community development in the EMA. The primary objective of this research article are to gauge (1) e-readiness of the citizens to use ICT as a communication medium; (2) the technological capabilities of ICT end-users and non-users; and (3) obstacles and barriers which may impact e-government implementation (social, cultural, etc).

## Research Method and Data Gathering

A survey instrument developed gauges EMA citizen's ICT needs and capabilities. This survey tool attempts to obtain a snapshot of the current ICT status of EMA citizens. The authors' rationale is that social, cultural, and other contextual factors are often ignored in the development of ICT strategies. In order to overcome this shortcoming, it was considered important to bring these factors "on board" for planning the eThekwini Municipality's e-government strategy. The survey instrument comprises two sections:

- **Section 1: General Information:** Section 1 contains three subsections: (1) citizen personal information; (2) experience in using a computer and access to the Internet; and (3) focus on the eThekwini Municipality Web site.
- **Section 2: Citizen's Information Needs:** Section 2 contains three subsections: (1) how citizens currently receive and would like to receive information about eThekwini Municipality; (2) how citizens currently interact and would like to interact with eThekwini Municipality; and (3) identify areas where the citizens would prefer eThekwini Municipality to provide access to PCs.

During May 2003, the questionnaire was administered face-to-face to 465 EMA citizens by the second author and seven temporary staff members. The duration of each interview was approximately ten minutes. The sample was selected at random basis. Both quantitative and qualitative data were collected. Interviews were conducted at EMA municipal (customer service) offices and municipal libraries. The requirement for effective e-governance requires a good understanding of the cultural or social background of its end-users (citizens in its communities). The citizen survey thus focused on the e-readiness of EMA citizens to "tap" into the new methods of communication for e-governance.

## Results and Discussion

ICT survey results are the reflection of e-readiness of EMA's citizens to use ICT as a communication medium with eThekwini Municipality and among themselves. Using SPSS software, the race grouping (Table 1) and computer experience (Table 2) were weighted to actual population composition of the EMA.

Table 1 shows the number of participants with household PCs by race.

Table 1 indicates that white citizens had the highest percentage (76.7%) household PCs. A significant percentage (89.5%) of black citizens surveyed did not have household PCs (Ethekwini Municipality: Quality of Life Household Survey 2002/2003, 2003). The average percentage of respondents surveyed that had PCs in their household is 21.7%.

Table 2 reflects the computer experience of respondents by race grouping. On the average, 58.7% of respondents reported that they had some computer experience. Computer experience by white citizens was relatively high (85.7%) followed by Asian citizens (77.5%). Black citizens reported the least (46.8%) computer experience.

Table 3 reflects employed respondents had the highest percentage (49.6%) of computer experience. This percentage was followed by respondents who were studying (21.4%).

Table 4 reflects matriculated respondents had the highest percentage (51.3%) of computer experience. It is interesting to note that those respondents surveyed who have no education, did have some computer experience (1.1%). Inadequate computer literacy and the lack of access to ICT are widely recognised as an increasingly daunting obstacle to the economic, civic, and political development of Africa (Badshah & Thumler, 2003).

The concept of e-government involves using ICT (e.g., Internet) to deliver public services (Rivera-Sanchez & Sriramesh, 2003). Table 5 reflects the age-grouping of respondents surveyed that had Internet access. Respondents with the highest percentage (43.2%) were those in

*Table 1. Race grouping of EMA respondents with household PCs (Source: Ethekwini Municipality: Quality of Life Household Survey 2002/2003, 2003)*

| Race Grouping | Percentage (%) of respondents who have a household PC |
|---|---|
| Black | 10.5% |
| Asian | 39.5% |
| Coloured | 28.6% |
| White | 76.7% |
| **Average** | **21.7%** |

*Table 2. Computer experience of respondents surveyed by race grouping*

| Race Grouping | Percentage (%) of respondents who have some computer experience |
|---|---|
| Black | 46.8% |
| Asian | 77.5% |
| Coloured | 64.3% |
| White | 85.7% |
| **Average** | **58.7%** |

the "21-30" age-grouping. The second highest age-grouping "31-40" reflects that 21% of respondents surveyed have Internet access. This tends to suggest that EMA citizens surveyed receive Internet exposure during their post-matriculation studies and in their employment environments.

Table 6 indicates that of the respondents surveyed with Internet access, 16.7% reported that they had visited the eThekwini Municipality Web site at URL http://www.durban.gov.za. See Table 6.

Table 7 reflects current delivery mechanisms that EMA citizens received information about eThekwini Municipality. A significant number (69.6%) of the respondents surveyed received municipal information (*MetroBeat* publication) delivered to their post boxes.

Table 8 indicates that 47.9% of respondents surveyed reported that they were satisfied with the current manner in which they received information from eThekwini Municipality about eThekwini Municipality. Heeks (1999) cautions that as an aid to entrepreneurs in the developing world, "poor entrepreneurs need more than money, skills, and infrastructure to make use of the data delivered by ICT." E-government must be about meeting the needs of citizens and quality of life (Pacific Council on International Policy, 2002).

Table 9 reflects respondent's preferred information delivery mechanisms for receiving information about eThekwini Municipality. About two-thirds (63%) of respondents surveyed reported that they would like to continue receiving information via the South African Post Office. It is interesting to note that only 5% of respondents surveyed reported that they would like to receive information via the Internet. On the contrary, when respondents surveyed were asked whether in future they would like to interact with eThekwini Municipality specifically via the Internet, 64.3% of them reported positively.

The aim is not simply to deliver services electronically in the EMA but to encourage its citizens to start learning about the Internet via its Web site and thereafter make use of the Internet for other services. The success of the Internet should be measured in terms of accessibility and contribution to social progress, rather than in terms of numbers of connected individuals (Kamel & Hussein, 2000). Evidence suggests that countries that have experienced the most rapid diffusion of ICT have also experienced the most rapid rates of employment and output growth (Baily & Lawrence, 2001). The Ethekwini Municipality Integrated Development Plan 2003-2007 (2003) states that its strategic commitment is to develop a smart city as part of the process of economic development and "a shift to service and knowledge-based activities."

In response to the question regarding the preferred location where respondents surveyed would like to have PCs installed, 51% of the respondents surveyed reported that it should be installed in municipal libraries, 20% in schools and 13% in shopping centres/malls (see Table 10). Some respondents stated, "the idea of computers in libraries and shopping centres is good, they take their time to resolve queries," "timing bad sometimes" and there is

*Table 3. Proportion of participants who were experienced with computers by occupation status*

| Occupation status | Percentage (%) of respondents who have some computer experience |
|---|---|
| At school | 4.1% |
| Studying | 21.4% |
| Employed | 49.6% |
| Self-employed | 11.2% |
| Not working | 12.3% |
| Pensioner | 1.4% |
| **Total** | **100%** |

*Table 4. Proportion of respondents with experience in computing by highest level of education*

| Level of Education | Percentage (%) of respondents who have some computer experience |
|---|---|
| No education | 1.1% |
| Primary | 0.4% |
| Secondary | 10.5% |
| Completed matriculation | 51.3% |
| Not working | 10.9% |
| Diploma/Degree | 25.8% |
| **Total** | **100%** |

*Table 5. Proportion of age-grouping s with Internet access*

| Age-grouping | Percentage (%) of respondents with internet access |
|---|---|
| Under 21 | 16.7% |
| 21-30 | 43.2% |
| 31-40 | 21% |
| 41-50 | 11.1% |
| 51-60 | 6.2% |
| 61-65 | 1.2% |
| Above 65 | 0.6% |
| **Total** | **100%** |

rather a need to "upgrade township services." Research shows that to implement public access centres extensively, is a big challenge (Fernández-Maldonado, 2003).

In summary, the authors' survey focused on establishing a better understanding of how ICT can contribute to eThekwini Municipality's citizen service delivery and development communication. The main objective was to establish how EMA citizens perceive new technology and their willingness to "try out" ICT as a new form of communication (e-readiness). This survey also analysed the social factors related to the eThekwini Municipality's progressiveness with e-government and some future challenges for governance using ICT within EMA. Some management implications for consideration are now suggested.

## Management Implications

From this study, the authors suggest the following criteria serve as important management implications for implementing a successful e-government strategy in the EMA:

- **Physical Access:** Access to communications and the Internet is a cornerstone of a municipal information society. Digital inclusion cannot be achieved without providing all EMA citizens access with affordable ICT appliances to the information highway. Citizens should be able to access public and government records including all the information they require in a modern democratic society (UNESCO, 2003). The findings of the authors' re-

*Table 6. Proportion of respondents with internet access who visited the Thekwini Municipality Web site*

| Percentage (%) of respondents who visited theThekwini Municipality Web site | Percentage (%) of respondents who have NOT visited the eThekwini Municipality Web site |
|---|---|
| 16.7% | 83.3% |

*Table 7. Current delivery mechanisms for receiving information about eThekwini Municipality*

| Delivery mechanism | Percentage (%) of respondents |
|---|---|
| Telephone | 4.3% |
| Post Office | 69.6% |
| Municipal office | 7.6% |
| Municipal publication | 13.3% |
| Community meeting | 4.4% |
| Internet | 0.1% |
| School/Tertiary | 0.7% |
| **Total** | **100%** |

*Table 8. Level of citizen's satisfaction regarding the manner they received information about eThekwini Municipality*

| Satisfaction Level | Percentage (%) of respondents |
|---|---|
| Not satisfied | 9.2% |
| Average satisfaction | 37.1% |
| Satisfied | 47.9% |
| Don't know | 5.8% |
| **Total** | **100%** |

*Table 9. Preferred delivery mechanisms for receiving information about eThekwini Municipality*

| Delivery mechanism | Percentage (%) of respondents |
|---|---|
| Telephone | 9% |
| Post office | 63% |
| Municipal office | 3% |
| Municipal publication | 11% |
| Community meeting | 5% |
| Internet | 5% |
| E-mail/SMS | 4% |
| **Total** | **100%** |

search shows that citizens surveyed prefer access to PCs installed in municipal libraries.

- **Appropriate Technology:** Establishing the appropriate method of interaction must be identified to ensure that technology reaches all EMA citizens. The challenge is to chart an appropriate course which does not perpetuate Gumucio-Dagron's "new apartheid" syndrome (Gumucio-Dagron, 2003).
- **Affordability:** The communication mechanism, whether in regional centres or via PCs, should be affordable to EMA citizens (end-users)
- **Human Capital:** Training and re-skilling will be necessary. As many EMA citizens lack ICT skills, "digital literacy" and/or do not have access to PCs, demonstrations on how to effectively utilise ICT technology (e.g., e-mail/SMS) must be provided. Help should be

*Table 10. Preferred locations for PC installation and associated percentage*

| Preferred location for PC installation | Percentage (%) of respondents |
|---|---|
| Municipal library | 51% |
| School | 20% |
| Municipal office | 8% |
| Clinic | 8% |
| Shopping centre/mall | 13% |
| **Total** | **100%** |

given to people to learn how to use a computer and access information and services on the Internet (UNESCO, 2003). Furthermore attention must be afforded to the training of teachers to adapt to the new learning environment. ICT demands that citizens be perpetually in a learning environment.

- **Relevant Content:** The content developed must be locally relevant to its constituency, especially in terms of language. Language is the foundation of communication between people and is also part of their cultural heritage (UNESCO, 2003). Averweg, Barraclough, & Spencer (2003) suggest that a Web site must facilitate access by end-users not familiar with Internet norms and whose home language is not English. Nowadays the priority is the creation of bridges between linguistic communities to facilitate the circulation of texts in more than one language (UNESCO, 2003). To bridge the digital divide through e-government, e-government must be relevant to citizens. The motivation for using ICT should stem from citizens having their needs addressed (Pascual, 2003). For these citizens' needs, the authors suggest community-focused applications, content management, and knowledge sharing. There is a need to strengthen the political and cultural will to offer Internet users a wider choice of languages (UNESCO, 2003).
- **Political Will:** Nothing is more critical to the success of e-government than political will (Pacific Council on International Policy, 2002). The political will of EMA citizens, eThekwini Municipal councillors, eThekwini Municipal officials, social groups and the business community will need to be secured to facilitate a successful e-government implementation project.
- **Integration:** ICT must not act as a further burden to EMA citizen's lives. ICT should be integrated into priority sectors of the EMA economy and into citizen's daily lives. This should be coupled with efforts to de-mystify and de-demonise ICT for people to accept it as an everyday tool and not an end to itself (OleKambainei & Sintim-Misa, 2003). The authors suggest that the challenge will be to balance the demands of a few very literate and demanding citizens with a majority who may probably never move to the electronic world. One suggestion is to focus on ICT-based trade as a precursor to fully-fledged e-commerce. Kamel & Hussein (2000) report that with continuous developments in ICT, there are "remarkable contributions to the growing global environment with implications on individual and societal aspects of life".
- **Socio-Economic Factors:** The South African government has a responsibility for the well-being of its employees that cannot be ignored as new technologies are introduced. There is a need for capacity building in the acquisition and application of new technologies for the information poor (UNESCO, 2003). The socio-economic status of EMA citizens (end-users) should be considered. By evaluating their e-readiness, this will determine the usability of e-government tools. Innovations in ICT have had remarkable effects on socio-economic development (Kamel & Hussein, 2000). The socio-economic status of Web site users determines their requirements (Averweg, Barraclough, & Spencer, 2003).
- **Legal and Regulatory Framework:** Government regulations affecting technology use and changes that need to be made to create an environment that fosters ICT usage must be considered. The effect of legal and regulatory framework on ICT use should be geared to facilitate the growth of the digital age.

Successful e-governance should be able to not only attract citizens who are already connected online but also to move citizens who are not already there. Therefore, e-governance is not only about reforming work processes within and among governmental institutions but is rather about improving government services to and in collaboration with citizens and business organisations. This will foster the development of a municipal information society. Some future trends for the acceptance of e-governance are now given.

## FUTURE TRENDS

Given the changing role of technology in government, the authors suggest four contextual factors that are primary to the future acceptance of e-governance in the EMA:

- **Usefulness:** EMA citizens must be convinced of the relevant advantage of using ICT. Embracing ICT should be perceived as easier, faster, and less expensive than current processes. ICT needs to be understood and considered to be useful by EMA citizens.
- **Ease of Use:** EMA citizens must be comfortable with the use of ICT. If the appropriate skills and understanding of ICT are in place, then the use of ICT will be easier thereby making its acceptance in the EMA more likely.
- **Intention:** EMA citizens must intend embracing ICT and have a positive attitude towards it. Citizens who view ICT which has no potential in what they are doing are unlikely to accept the potential of ICT.
- **External Variables:** These are factors affecting EMA citizen's acceptance of ICT, which are beyond the individual's control.

It is important that innovative ICT be adopted by EMA to deliver to all its citizens improved services, reliable information, and greater knowledge in order to facilitate the e-governance process by encouraging citizen participation. This will serve to improve information flows in a municipal information society.

## CONCLUSION

Public participation is an important element in the stages of the e-government process, from defining a society's vision and priorities for e-government to determining e-readiness and managing e-government projects (Pacific Council on International Policy, 2002). E-government is not just about municipal Web sites, e-mail, and SMS. It is not about service delivery using ICT via the Internet. It is not about digital access to eThekwini Municipality information. It is about how EMA citizens change in relating to their eThekwini Municipality and the degree to which e-governance changes citizens relating to each other in a municipal information society.

This research suggests that possibly South African local governments need to assess their respective e-readiness to adopt e-government strategies or implementation plans. While there is a drive for e-government in South Africa, this needs to be tempered especially in terms of the considerable obstacles to rolling out e-government in South African municipalities. Research needs to be conducted by South African municipalities regarding issues that may impact their e-government development strategies. This will facilitate an appropriate ICT infrastructure being made available. To seek building an ICT capacity without a solid foundation of research and development is nothing but building a skyscraper in quicksand (Okpaku, 2003). It will also identify skills gaps required to use ICT effectively and some social and cultural barriers for an effective e-government strategy within each South African municipality. Should the appropriate research be undertaken, South African municipalities will be able to ensure they adopt an appropriate ICT infrastructure for their citizens thereby improving ESD and narrowing the digital divide.

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## KEY TERMS

**Digital Divide:** At the broadest level, term refers to the gap between those individuals who own, access and effectively utilise information and communication technologies and those who do not. However, since the it involves a complex Web of interconnected social, economic, and cultural factors that cannot be fully captured by a definition that focuses solely on access or ownership, "Digital Divide" is defined as a social, economic, and political fracture in a knowledge-based global economy.

**Electronic Service Delivery:** Electronic Service Delivery (ESD) is a method of delivering services and conducting business with customers, suppliers and stake-

holders to achieve local government developmental goals of improved customer service and business efficiency.

**E-Governance:** E-governance refers to a local government's inventiveness to electronically govern areas under its jurisdiction.

**E-Government:** E-government refers to the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners, and employees.

**E-Readiness:** E-readiness may be defined in terms of availability of ICT infrastructure, the accessibility of information and communication technologies (ICT) to the general citizen population and the effect of the legal and regulatory framework on ICT use.

**Municipal Information Society:** Municipal Information Society is defined as the innovative use of information and communication technologies (ICT) to improve the internal operation of a municipality as well as its communication and collaboration with citizens and business organisations in a municipal region.

**Quality of Life:** The ability to integrate a fulfilling and productive work life with a fulfilling personal and family life.

# ICT in the Islamic World

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## INTRODUCTION

A priori, the Islamic Republic of Mauritania was not prepared for the information and communication technology (ICT) revolution. This vast West African desert country, whose 2.8 million inhabitants are strongly imprinted by Islamic culture, is still firmly rooted in customs and social values that the "late and superficial" French colonization was hardly able to disrupt (Balans, 1979).

Under these conditions, one can easily understand the slow evolution of information and communication technology in the country as it appears in the Report of the ICT Thematic Group of the Poverty Reduction Strategy Paper (Cadre Stratégique de Réduction de la Pauvreté, 2000).

As a matter of fact, it was not until 1974 that the first institutional incentive for development of computer technology appeared through the creation of a computer division at the Ministry of Finances responsible for the automated management of public spending. The first PCs appeared in the mid-eighties in some administrative departments, in particular the customs department through the SYDONIA project, designed to manage customs operations and the provision of certain statistical data (Cadre Stratégique de Réduction de la Pauvreté, 2000).

In 1990, the government founded the National Data Processing Commission, a body for strategic analysis entrusted with the broad mission of designing, implementing, and monitoring the national data processing policy. The Commission also aimed to computerize some administrative departments, such as Civil Service, the Central Bank of Mauritania, or the taxation authority (Cadre Stratégique de Réduction de la Pauvreté, 2000).

In general, computer use remained very scarce for a long time throughout the Mauritanian administration. In 1999, there were 446 micro-computers, seven mini-computers, and only 20 local networks of 10 machines, which correspond to a ratio of two computers for every 100 agents. Local software production is insignificant, with only two development platforms in the private sector (Cadre Stratégique de Réduction de la Pauvreté, 2000).

Concerning the Internet, main indicators as of May 31, 2000 show an average rate of use of approximately 0.16% when one compares the total number of e-mail accounts in Mauritania to the total number of inhabitants. This rate is 0.46% in Nouakchott, the capital city. The rate of Internet use by telephone subscribers is 20% on average and 28.9% in Nouakchott (Cadre Stratégique de Réduction de la Pauvreté, 2000).

In the field of telecommunications, it was only by the end of the 1970s that the telephone appeared in some regional capitals; as of May 2000, the urban telephone network has more than 20,000 lines (Cadre Stratégique de Réduction de la Pauvreté, 2000).

Thus, in the year 2000, the ICT sector was in its preliminary stages, marked by a lack of infrastructure, equipment, and human resources.

On the eve of the new millennium, the Mauritanian government was truly committed to mastering ICT, considering it an invaluable developmental tool for the integration of the country into the "communication arena" which constitutes the "information society" (Levy, 1997). The national strategy for the development of new technologies adopted in 2002 is attributable to a strong ambition to promote Mauritanian society and economy using ICT.

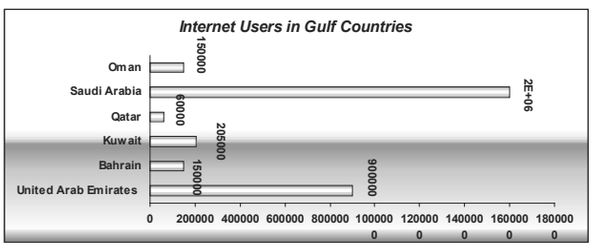
Being definitely in keeping with an e-government perspective, the strategy advocates, among other objectives, the use of information and communication technology by the administration in to improve services rendered to users in compliance with individual rights and freedoms.

As an Islamic republic, Mauritania has witnessed specific challenges to the development of new technologies. This study will examine the moral dilemma faced by Muslim countries regarding the evolution of ICT and e-government. Thus, the experiences of Mauritania will help to paint a broad picture of how these new technologies are being implemented throughout the Muslim world.

## THE INTRODUCTION OF ICT INTO THE ISLAMIC WORLD

Strangely enough, Islam, which is often depicted as obscurantist by a generally ill-informed opinion, did not at all challenge the new information and communication technology considered as a symbol of freedom, modernity, and progress. In other words, the emergence of ICT did not stimulate a debate in the Islamic world, even if

*Figure 1. Internet use in the Arabic Gulf countries (Source: Information Society in the State of Qatar, 2003, WSIS—Geneva 2003)*




historically "some sort of hesitation" was observable at first in this respect, particularly in the Arab Gulf countries. Hence, in Saudi Arabia, the government signed a memorandum of understanding in 1999 with a company for the installation of Smart Filter software, designed to prevent access to subversive sites or sites whose contents could conflict with principles Islam. In Kuwait, the department of information announced openly on its official Web site that censorship (on the Internet) was one of its prerogatives!

But in general, these hesitations have been more or less overcome, probably largely on account of the sustained infatuation of Muslim populations for the Internet, as illustrated by Figure 1.

Generally speaking, as reported by two studies sponsored by the Islamic Organization for Education, Sciences, and Culture (ISESCO); Muslim countries are actively engaged in promoting ICT, which is perceived as a factor of development (Bennani & Mrabet, 2003; N'Diaye, 2003). The ranking based on the digital access index of the International Telecommunications Union (ITU) shows that several Muslim countries are highly ranked as indicated by Table 1.

Today, it can be said that new information and communication technology is accepted in the Muslim world as supported by the declaration adopted by the Islamic Conference Organization (OCI) during its 10th Summit in Putrajaya (Malaysia, October 11-17, 2003) which states, "We acknowledge that in the knowledge based society in which we live today, Information and Communication Technology is a powerful and necessary tool of political, economic and social development …"

In reality, it could not be otherwise because Islam, to start with, is meant to be a religion of knowledge and science. Accordingly, the first verse of the Koran glorifies knowledge in the following words, "Read in the name of your Lord! He the creator; (…) who taught man what man did not know before" (Ould Bah, 2003).

*Table 1. 2003 ranking of countries according to ITU index (excerpts)*

| | Rank | Country | ITU Index |
|---|---|---|---|
| Excellent | 1 | Sweden | 0.85 |
| | 11 | United States | 0.78 |
| Good | 34 | United Arab Emirates | 0.64 |
| | 38 | Bahrain | 0.60 |
| | 46 | Malaysia | 0.57 |
| | 48 | Qatar | 0.55 |
| | 49 | Brunei Daressalam | 0.55 |
| | 60 | Kuwait | 0.51 |
| Medium | 70 | Turkey | 0.48 |
| | 82 | Saudi Arabia | 0.44 |
| | 87 | Iran (R.I.) | 0.43 |
| | 98 | Egypt | 0.40 |
| | 99 | Tunisia | 0.41 |
| | 118 | Morocco | 0.33 |
| Weak | 126 | Syria | 0.28 |
| | 129 | Pakistan | 0.24 |
| | 157 | Mauritania | 0.14 |
| | 158 | Senegal | 0.14 |
| | 163 | Côte d'Ivoire | 0.13 |
| | 178 | Niger | 0.04 |

However, one must refrain from considering the Muslim world as now totally and definitively in favor of ICT. In fact, Resolution # 4 of the OCI Summit states that "*rather than be an end per se*, the development, assimilation, and application of information and communication technology (ICT) in the member states are the main instruments targeting the achievement of global and sustainable development and ensuring access to the information society." The expression "*rather than be an end per se*" underlies a quite well thought-out reservation expressed by the Prime Minister of Malaysia, Muhammad Mahatir (2003) who said in an interview in December 2003 with the Journal *Choix*,

*the Internet does not only produce good information, but it also produces obscenities. There are those who think that they can decide for themselves whether they have moral values, but trying to instill good values in them is not the easiest thing in the world. We should try to find a means to filter obscenities. Presently, technology does not provide us with the ability to means of selectively screen access. But the time will come when software will help to eliminate obscene and morally subversive material.*

With respect to this matter, Muslim states feel a need to protect their societies against some of the material that can circulate freely on information networks, especially data that undermine order and morality. However, these

concerns are not specific to Muslim countries. Quite similar concerns led the U.S. Congress to adopt the Communication Decency Act in February 1996 designed to fight indecency on the Internet. But this Act, which was declared unconstitutional by the Federal Court of Philadelphia on account of the right to freedom of expression, was also criticized on rational grounds: Is it really possible to censor the Internet? These concerns, now obsolete in the West, led P. Nicoleau (1996) to recommend the creation of an international authority in charge of fighting immorality on the Internet!

In Mauritania, ICT must first be perceived in relation to the recurring debate on authenticity symbolized by Islamic values and the modernization that the country has experienced since independence. In this respect, and in an effort to provide a strong synthesis, the Preamble of the Constitution of July 20, 1991 states that the people of Mauritania desire to begin "creating the conditions for a harmonious social evolution that is *respectful of the principles of Islam, the only source of righteousness*, and that is open to *the requirements of the modern world* …" (Ould Bouboutt, 1994). In other words, Mauritania is clearly seeking to open up to the world, taking its place in the information society while remaining faithful to its Islamic ties!

Thus, the highest Mauritanian authorities consider the incorporation mastery of ICT as a requirement of globalization and encourage the public to use this technology. In this context, the creation of a department in charge of developing ICT as of September 2000, and assigned to a woman, was regarded as a pioneering (and audacious) initiative in the Muslim world, and is attributable to a deliberate choice in favor of modernity.

Additionally, and like other Muslim countries, the Mauritanian authorities have not eluded the difficulties likely to emerge because of inappropriate use of ICT, especially consequences deriving from such use with regard to the (vulnerable) Mauritanian social fabric. The national strategy for the development of new technologies clearly foresees these concerns "as Mauritania believes that *if new technologies are adapted to the context of the country*, they can contribute significantly to reducing poverty and underdevelopment."

This is why the Secretary of State for New Technology truly involved religious scholars in the design, validation, and implementation process of the national strategy for the development of new technologies. Religious scholars became involved in the governance process of ICT "in order to support its good use … and assess any issue addressing ICT. The government will create a framework for a national debate on ICT (including religious scholars, civil-servants, experts, economic operators, and associations) …"

For those who drafted the strategy, there is a need to "communicate to the general public the legal and *ethical* principles as well as the technical choices based on which the government plans to lead the society as a whole on how to use ICT properly." In this context, appealing to religious scholars was necessary for two reasons: obtaining the support of the people because the participation of the religious scholars is per se a guarantee of authenticity for the population; and reassuring religious authorities in general about the scope of the strategy in regards to religious principles.

## E-GOVERNMENT IN MAURITANIA

Administration cannot be cut off from its environment. The introduction of new technologies in the Mauritanian administration remains largely dependent upon the general situation of these technologies in the country. To this effect, a general trend for reform was experienced by Mauritania in ICT development as part of the Sector Policy Declaration for Postal Services and Telecommunications (1998), which liberalizes the sector, and especially the Poverty Reduction Strategy Paper (2000), which advocates an extensive use of ICT as a factor of development and economic growth.

As part of this framework, the first mobile phone licenses were awarded by the Regulation Agency, an independent administrative authority founded in 1999.

In order to facilitate access to ICT, computer hardware and equipment were exempted from all duties and taxes in 2000, and the Agency for the Promotion of Universal Access to Services was founded in 2002.

Accordingly, the creation of the Secretary of State for New Technology (SSNT) in 2000 marked an important turning point. This department reporting to the Prime Minister—an indication of its importance—has "a broad mission of promoting the use of computers and associated technology by the *administration*, the private sector, and civil society."

The National Strategy for the Development of New Technologies was approved in 2002. This public policy, which was designed by the SSNT as part of a participatory process in collaboration with the targeted administration, the private sector and the civil society; is a global strategy aimed at helping Mauritania become a member of the information society. It is based on eight main axes including the development of infrastructures, the valorization of human resources, the modernization of the state thanks to digital tools, the adaptation of the legal framework, the promotion of ICT in the private sector, and the visibility of Mauritania on the World Wide Web.

The implementation of the strategy had an unquestionably positive impact on the sector of ICT in Mauritania. The ratio increased from 0.5 phones per 100 inhabitants

*Figure 2. Use of technological material in the administration (Rapports de l'OTIM 2003, 2004 et du CSRP—Groupe thématique NTIC, Mai 2000)*

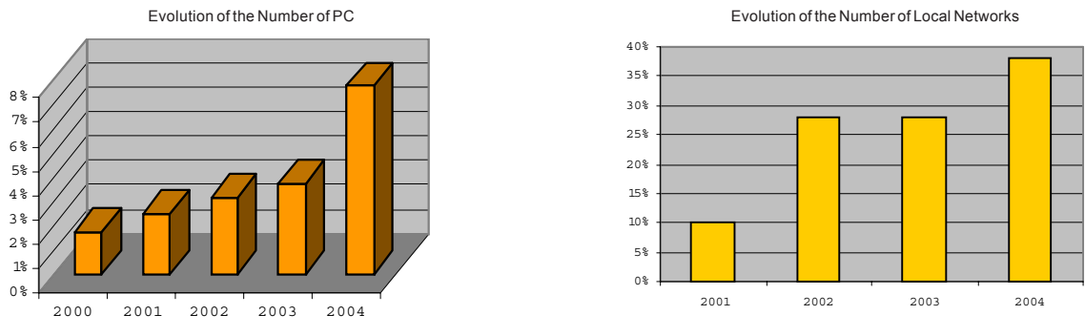
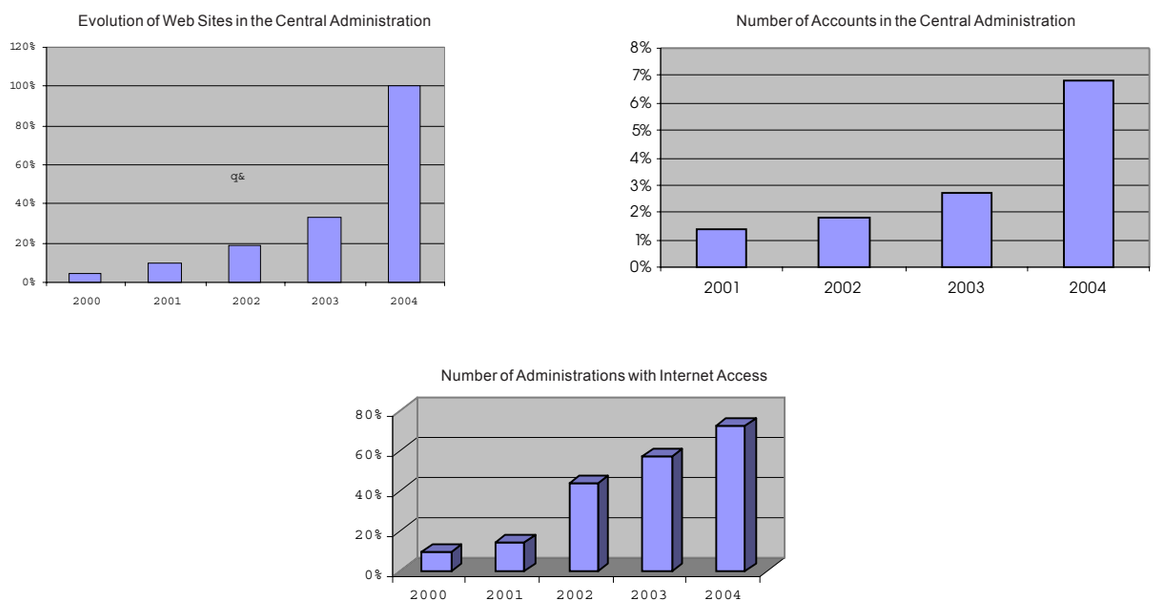



*Figure 3. Evolution of Internet use by the administration (Rapports de l'OTIM 2003, 2004 et du CSRP—Groupe thématique NTIC, Mai 2000)*



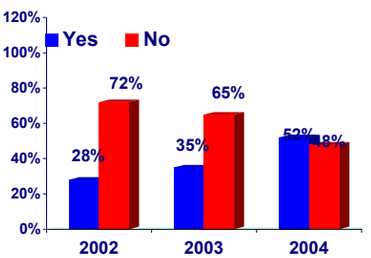

in 1998 to more than 20 as of December 2003; the Internet access bandwidth increased from 256 Kbps in 2000 to 45 Mbps in 2004, and a significant increase in the use of the Internet and associated technology developed in the administration, the private sector and civil society.

With respect to the administration, the third priority axis of this strategy (modernization of the administration through the use of digital tools) assigns a key role to e-government, which is a system of government involving a wider scale use of information and communication technology in the work of the administration and its relation with the public.

In this regard, the strategy shows that "the insufficient level of introduction of computers and new technologies into the administration might penalize the effort to modernize this administration." Based on this acknowledgment, the strategy provides for "increasing the role of computers and associated technologies at all levels of the administration and *ensuring the development of an online public service,*" which marks an indirect but definite reference to e-government.

The implementation of the measures pertaining to the third axis of the strategy started in 2002; Figures 2, 3, and 4 show the evolution of the main indicators on this issue.

*Figure 4. Proportion of administrations using databases (Rapports de l'OTIM 2003, 2004)*




Thanks to the National Program for Good Governance (Pouillaudes, 1999) and to its component, the Civil Service Modernization Program, the government adopted the Administration Computerization Scheme in May 2004. This computerization scheme aims at achieving a *first stage of e-governance* for the central and local administration in early 2006; it is based on four objectives constituting the *pillars of the modernization of the Mauritanian administration*:

- Development of infrastructures and equipment
- Development of Web based contents
- Development of human resources
- Adaptation of the legal and institutional framework

With respect to *infrastructures and equipment*, the scheme provides for the acquisition of technical means (support and transportation) to help service and public agents communicate with each other, with the outside and with the users in particular to modernize administrative work and automate certain procedures based on a secure intranet and access to the Internet using a bandwidth of 50 Mbps at least (fiber-optic equipment, VSAT and BLR for the territorial administration).

Additionally, the scheme aims to set up a local area network (LAN) for each administration, providing every service therein with at least one computer, and a package of software and standard applications. To this effect, the computing needs of the administration were identified and assessed, mainly through computer technology development plans designed for several departments.

Several important steps to achieving these goals have already been or will soon be undertaken, such as the first phase of a high-speed administrative intranet scheduled for commissioning in December 2004. Other projects scheduled for 2005 include implementing an administrative data center for the management of infrastructures, providing intranet and Internet access to the administration, networking the departments, and upgrading the administration's Internet bandwidth from 1 to 2 Mbps.

Actions relating to *Web-based content* are at the center of the e-government process through the design of a full system of information for the administration, including the creation of Web sites and online public service indexes, several of which were or are about to be designed at the departmental level.

Additionally, a contract signed with Microsoft (2003) tentatively provides for the online hosting of two public services in 2005. The following full involvement of the Mauritanian people in the process is expected, their show of interest in online the publication of the electoral lists since 2001 and in the computerization of the civil registry service, both intended to guarantee transparency in the presidential and legislative elections.

At present, the SSNT has already implemented a telemedicine project aimed at putting ICT at the service of the health sector to promote better patient care and personnel training through national and international interconnection of Mauritanian hospitals. Similarly, another project contributed to the creation of Internet centers in secondary schools.

With respect to *adaptation to the legal framework*, a bill drafted by the SSNT attempts to define the conditions for the creation and use of computer systems and public internet sites.

This bill, which will constitute the charter of e-government in Mauritania considers that ICT "*must contribute to improving administrative work and facilitating contacts between the administration and the public.*" Referring to the policy of modernizing civil service, the bill states "the need to improve information and services rendered to the public and the need to increase the efficiency of the administration."

Article 2 of this bill identifies the responsibilities of each administration in matters of e-government. These responsibilities specifically consist of:

- Improving the management of computer hardware and other associated technological equipment
- Specifying the types of information to be disseminated and the types of services to be developed on the Internet
- Organizing the digitalization and the dissemination of data
- Ensuring compliance to regulations related to the security of information systems, the protection of personal data and recognition of intellectual property rights

The plan also provides for an online official journal because "in order to be usable, legal information must be

known and published and, as a matter of fact, new technologies provide unequalled possibilities for the dissemination of legal information" (Coutrot, 2004).

These various initiatives will be supported by an original and efficient *training* policy in ICT. This policy, which is already engaged mainly through the national program for the training of public decision makers (ministers and members of parliament), was followed up in 2004 through a vast training program for civil servants and government agents in ICT for the benefit of advisers, directors and heads of services of the central administration. Therefore, about one fourth of the administrative personnel were trained in the use of office automation and the Internet. This effort will be completed by a plan to retrain the technical personnel of the administration in ICT (at least two computer specialists per department) through training workshops and seminars for the benefit of technicians, engineers and network administrators and, of course, through distance learning techniques.

Finally, in order to reinforce this mechanism, diverse supporting measures are planned. These measures deal in particular with reducing the costs of and promoting universal access to ICT through the development of infrastructures, with a vast movement for the dissemination of ICT among people who are the ultimate target of e-government.

## CONCLUSION

The governments of Muslim countries, like other countries in the world, cannot and do not want to remain cut off from the digital revolution, even if the impact of ICT varies according to the wealth and rigor of the system of social value in each country.

In Mauritania, supporting ICT and, in particular, e-government is clearly a priority for the state as important steps were made, *in a short period of time*, to introduce as part of clearly stated public policies a digital *component* to administrative procedures and work. This is indeed a successful evolution, and in view of recent favorable oil prospects, Mauritania will now have the means to set up an e-government, which appears today an urgent necessity.

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## KEY TERMS

**BLR (Boucle Locale Radio: Radio Local Loop):** Telecommunication network system helping to link telephone (or Internet) subscribers using a hertz radio link instead of copper wires.

**E-Government:** Institutional system in which the administration uses information and communication technology to manage its relations with its public, to improve public services and to reinforce public policies.

**Intranet:** Computer network designed for the exclusive use of an institution and using the same protocols and techniques as the Internet (TCP-IP).

**Online Public Services:** Services (information, provision of services) provided by the administration to users from an Internet site.

**Retraining:** Training operation aiming at providing the technical staff of the administration, in lieu of its initial training, with training in ICT so that it can carry out administrative tasks pertaining to the domain of ICT.

**VSAT (Very Small Aperture Terminal Satellite):** Satellite communication system which receives information transmitted from a geostationary satellite toward which a central earth station is pointed.

# ICT, Work Organisations, and Society

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## INTRODUCTION

The present fourth period, the network period, is characterised by a convergence of three main technologies (computer technology, telecommunication technology, and media technology) into information and communication technology (ICT). ICT are embedded in many things and the invisible microcomputerisation that once took off with the chips is enhanced through nanotechnology, biotechnology, and wireless technology—often entitled ubiquitous computing. The author presents ongoing changes in work life and presents a rtheoretical model: The convergence theory on ICT and psychosocial life environment. The convergence model reflects some main ongoing processes in the network society encompassing various spheres of life (professional, private, and public). Sociological theories on the Information Society are discussed in this context as well as theories from the information systems (IS) community. In the Future Trends section the new international collaboration is addressed where research and policy (including politics) develop goals and strategies to deal with societal and psychosocial changes related to the development, introduction, and use of ICT.

## BACKGROUND

The area, Information and Communication Technology and its interaction with social changes on organisational, individual, and societal levels, has in the 2000s received growing attention, due to the depth and wide use of it. This article is mainly based on my latest two books. The first one, *Humans on the Net: ICT, Work Organization, and Human Beings* (Bradley, 2001) was presented at the first European Union (EU) conference, *Work Life 2000*, during the half year when Sweden chaired EU. The second book, *Social and Community Informatics: Humans on the Net* (Bradley, 2006), summarises and updates the authors research over 30 years. It will hopefully serve as a source for people to better understand and contribute answers to questions such as: How will people live, learn, and work in the future ICT society? In short, key issues within the organisational change/psychosocial life environment, and their interaction with the use of information and communication technology are analysed.

Some sections were presented at the *World IT Forum* (WITFOR 2003) in Vilnius in August 2003 addressing "Social and Ethical Aspects of the Information Society" and at the conference, "E-society" in Avila, Spain in 2004.

Empirical experiences show that it is important to keep a balance between pure technical research and development in software and hardware technologies, new fields such as nanotechnology and the behavioural and social science disciplines, for example, psychology, sociology, cultural anthropology, and ethnography.

The ICT-related disciplines have so far been focused too much on the "technology push" instead of on human needs and requirements in the development, introduction, and use of ICT. New universities, sometimes called IT universities, are appearing in many European countries trying to bring together disciplines from the traditional university and disciplines from the technical university to facilitate a necessary rethinking and reorientation of research and development (R&D), sometimes resulting in new centres directly entitled "Humans in the ICT Society" focusing on the human, organisational, and societal aspects of ICT use.

## THE NETWORK ERA: CONTINUOUS AND ACCELERATED CHANGES IN THE DESIGN OF ORGANISATION, WORK TASKS, AND MANAGEMENT

The main changes during the network period are summarised in the next five sections and are mainly based on Bradley (2001) and further developed in Bradley (2006). They are primarily derived from our research in the developed countries.

### Accelerated Changes at Work in the Net Era

More flexible work processes have appeared regarding both the professional role itself and leadership. Further, the professional role, the learning role, and the role of citizen are becoming more and more integrated. Repetitive

jobs and physically strenuous jobs, including routine work, are disappearing and a total upgrading of qualifications has occurred. In parallel with this, the organisation has become flattened out. In an international perspective more work tasks are becoming similar because software programs are sold world-wide and the work tasks are carried out in a more and more similar way.

Organisational structures as networks have become more and more common. Psychosocial and organisational aspects of networking have come into focus in recent research.

## Network Organisations are Like Crocheted Table Cloths

- A crocheted lace cloth is a good model for the developing and future structure of how the world—social systems, organisations, and official authorities—will look. The network era has been established and networks interact more and more wirelessly. It is possible to crochet all the time: each new loop (computer) is connected to another loop through the same yarn (tele-technology).
- Power can both be centralised and decentralised in the network structures, but the process is invisible.
- The distribution of power is now possible in quite a deep sense as competence transfers to the periphery, out to the production level.
- The hierarchical structures of companies that mirrored industrialisation and industrial technology during the mainframe period of the computerisation era are fading away.

The present trend toward the flattening of hierarchies can, according to Aulin's law of requisite hierarchy, be explained by the increasing regulatory abilities of individuals and organisations, due to such factors as better education, management, and technological support (Heylighen & Joslyn, 2001). Another way to express this is that hierarchical regulation and hierarchical organisations are built into information systems and ICT.

## Network Organisations: New Communication Patterns

Some examples of what characteristics the network organisations have and how people are affected are:

- direct communication between the various levels of the organisation
- barriers between idea and execution are disappearing
- reallocation of power in the organisation
- continuous changes of structure and roles
- openness to the surrounding world
- multidimensional virtual culture

## Decreasing Core Workforce in the Flexible Company

At the centre there is a core workforce of permanent full-time employees who enjoy a wide range of employment rights and benefits; however, the core workforce is decreasing. The other growing part is the peripheral workforce. It consists of part-time staff, self-employed consultants, subcontracted and outsourced workers, and temporary and agency employees. Some of these "knowledge workers" are key resources, while others are exchangeable. Through the network organisational structure they might have very strong positions in the company because of their expertise or social contacts, although this is unseen. Power is invisible in these new forms of organisations: power has no outward manifestation and is not reflected to the same extent as before in properties and gadgets linked to leadership.

Hence more and more organic organisational structures are developing, with a focus on flexible work processes, including dynamic networks for capital and human resources (compare the network organisations above). Economic systems are being created where the present boundaries are increasingly becoming eroded. Advanced ICT support is used for various forms of collaboration. More and more individuals function as self-governing company units.

## Reflections

There are both positive and negative impacts on the individual. One critical point is that too much responsibility is put on the individual who:

- loses permanent employment
- has to manage his/her own competence development
- has to market himself/herself
- is expected to take on any position and swallow job enlargement
- is expected to be creative – with little compensation
- is a unit in a competitive world market

One might ask if this means the freedom from paid work in a traditional sense. Other questions are: Should our school system prepare for fostering free agents or portfolio individuals? Should school and learning prepare young

people for acting proactively in meeting the ongoing unhealthy development? From an ethical point of view individual responsibility is "a word of honour". People need a basic security as (employees) citizens. Regarding the role as workers and citizens, there is a need for balance between a strong society and strong individuals. Few persons are strong throughout life. The importance of thinking in terms of sustainability both regarding environment and sustainable human beings is becoming clear.

### The Home Becomes a Communication Sphere

The big challenge in the near future is the home in a broad sense, as many human roles are converging to one life role, and the home is more and more understood in terms of virtual space as well as physical. Driving forces are converging embedded technologies. The following trends are enforcing the home as a communication sphere, where the home could be regarded as an extended family centre, a care centre, a multimedia centre, a centre for democratic dialogue, a marketplace, a learning centre, and an entertainment centre.

### The Occurrence of an Accelerated Tempo

Research shows that there are reasons to talk about ICT stress or Internet stress. Certain ICT stress is related to the fact that there is an increased dependency on computers and networks and an increased expectancy that these technologies are functioning well. Stress phenomena in the Internet world are information overload, contact overload, demands for availability, lack of organisational filters, and difficulty of separating noise from essentials, changing level of expectations, and an altered perception of time and space in general.

## THEORIES ON ICT AND ORGANISATIONAL AND SOCIETAL CHANGE

Theoretical models on "Computer Technology and Changes and Work Life" were developed by the author (Bradley, 1977, 1986/1989) and were empirically tested in three large work organisations in Sweden, representing three main historical periods of computer technology (from mainframe computers to microcomputerisation). The psychosocial work environment was considered in terms of the following perspectives: three levels of analyses (individual, organisational, and societal), objective and subjective work environments, interplay between the levels of analysis, interplay between objective and subjective work environments, interplay between working life and private life, and a life-cycle perspective.

The roots are in social psychology and organisational theories the way these disciplines were interpreted in the Nordic countries at the time. A main perspective is that the environment/structure on various levels is affecting the individual, but she/he can also impact the society on these levels. The concepts of the model include structural factors, our perception of these, and intervening variables that explain reactions but also have to be focused at the use and introduction of ICT.

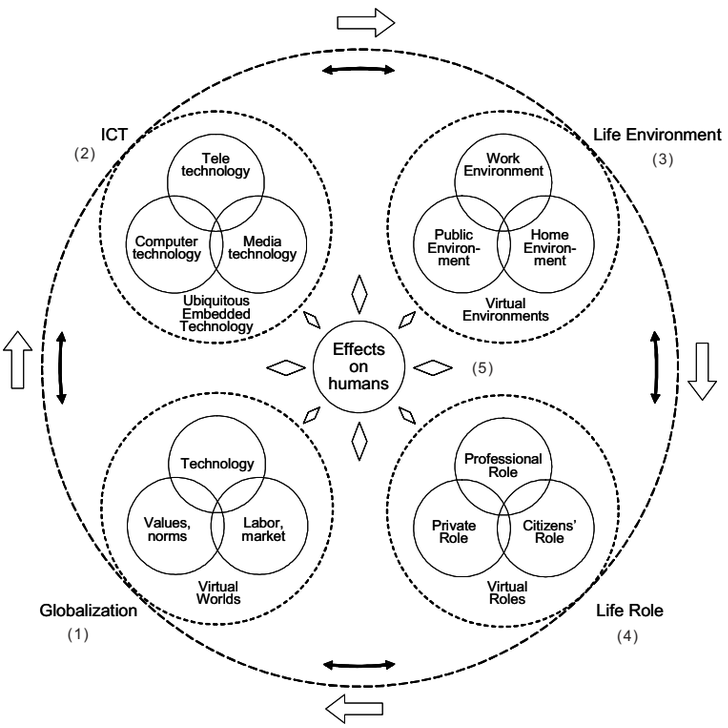
Psychological variables were used as general terms covering a number of intermediate, psychologically relevant variables such as the level of aspiration, weight attached to specific work-environment areas. *Psychosocial environment* referred to the process involving the interaction between the objective environment and the subjective one and, essential concepts within the psychosocial work environment included factors such as contact patterns and communication, organisational structure and design, work content and workload, participation in decision making, promotional and development patterns, salary conditions and working hours. Theories, methods, and results from the RAM programme were summarised in "Computers and the Psychosocial Work Environment" (Bradley, 1989) and appear also in "Social and Community Informatics" (Bradley, 20066), since the measures and tools are still relevant for studies of the social and organisational impact of ICT, but now are applicable in the broad life environment.

The present network period is based strongly on the convergence and integration of three main technologies: computer technology, tele-technology, and media technology. The convergence process (see Figure 1) is enforced all the time by smaller, cheaper, and more powerful components. ICT is more and more being used in almost every activity and embedded in more and more places (ubiquitous computing). Converging circles are reflecting graphically the ongoing process.

Both convergence and interactions are important features in the model. Convergence here means a move towards a common content. Interaction means that technology interacts with the social world with values and beliefs. There is also an ongoing interaction between the "clusters of circles".

The convergence model on "ICT and the Psychosocial Life Environment" is a graphical illustration of ongoing changes in the Net Society. It is presented in detail in Bradley (2006). Some comments concerning the model in Figure 1 will follow, and the description of structures with reference to concepts (1-5) in the outer circle in the figure.

*Figure 1. Convergence model on ICT and psychosocial life environment (Bradley, 2005, in press)*




1. **Globalisation*:*** A convergence is occurring between technology, economy, norms/values, and labour market and is entitled globalisation. The geographical span is changing. At present our work life is mainly based on national and international trade which will be more and more without limits in the future and will take global forms. Electronic commerce and electronic marketplaces are creating a strong change factor behind the structure of work life. The geographical space in the future is both global and beyond—including virtual reality (VR).
2. **ICT:** A convergence of computer technology, telecommunication technology, and media technology is occurring to become what is entitled ICT. Knowledge is managed in new ways. In the 2000s there are multiple channels to choose from: word of mouth, writing, audio visual, and electronic. In the future metachannels, for example, metamedia of VR and controlled reality environments (environments that are manipulated and managed in VR) will become more frequent. In the latest wars it has sometimes been unclear what could be "manipulated reality".
3. **Life Environment:** A convergence of work environment, home environment, and public environment are converging to a life environment, where the public issues tend to merge into our homes. A new emphasis on certain dimensions in the psychosocial environment occurs. New dimensions are appearing in the psychosocial environment. Openness for unforeseen implications is required.
4. **Life Role:** Professional role (work life) and private role (private life) and citizen's role (public life) converge to become a Life Role. Role and role formation are central concepts in social psychology and represents a level between structures and the individual. The concept "role" is a system of social norms that is directed to an individual as a member of a group or as belonging to a limited category of people. The concept "role" appears where psychology and sociology meet. It is also important that individuals can influence and form their roles.
5. **Effects on Humans:** Effects on the individual become more multifaceted and complex. This is valid both regarding the psychological and the physical effects on the individual. The way humans handle their situation can roughly be categorised as active or passive reactions. In the Figure 1 this is represented by the circle in the middle, "effects on humans", with two-way arrows around as a flower showing an interaction. In consequence, the individual is affected by ICT, the Life Environment with its three subenvironments, the Life Role with its

three subroles, and globalisation with its three components of values, technology, and labour market. But as an individual, that person can also influence the technology, the environment, and his/her own role and phenomena on the organisational and societal level, and the new virtual reality (see the following).

Four circles representing VR are marked with dotted lines and surround the four clusters of converging circles. These circles reflect our participation in cyberspace on various levels. In the lower left part in Figure 1, Virtual worlds is a concept that refers to the global level. Within the concept of ICT, the step taken by applied embedded and ubiquitous technology make the technology more hidden for the individual and in the society as a whole. Virtual environments in the upper right part of Figure 1 is already a common concept. Finally, virtual human roles are appearing, which in a more extreme form could be another personality that people play, for example, avatars.

The thin double-directed arrows represent interaction, and the broader one-directed arrows represent the main direction for the movement and the process described in the circle model. Transferred to actions people can, in the professional role, private role, and citizen's role influence our life environment on various levels of analyses (see also Future Trends section).

How do the convergence theory on ICT and the psychosocial life environment relate to other theories on the information society? What do other theories conclude about the information and communication society (ICTS)?

Frank Webster (1995), in *Theories of the Information Society*, provides a point of departure of an interrogative and sceptical view of the concept of an information society (IS). His approach is to start from contemporary social theories instead of social impact approaches. The following are categorised as pro-IS theories: post-industrialism, postmodernism, flexible specialisation, and the information mode of development. The following are against IS theories: neo-Marxism, regulation theory, flexible accumulation, the nation state and violence, and the public sphere. Webster brings forward five definitions of IS which represent criteria for the new society, by its own or combined: technological, economical, occupational, spatial, and cultural. References to some main theories are given in the following: Anthony Giddens (1990, 2000), Herbert Schiller (1993), Jurgen Habermas (1989).

Webster raises the question whether what dominates now is a break or continuity and his conclusion is that there are still features of a capitalist continuity, but also a shift in orientation with some novel form of work organisation and some change in occupational pattern. But there is no system break witnessed so far (Webster, 1995). However a group of theorists categorised as postmodernists (Barthes, Baudrillard, Vattimo, & Lyotard) point out that the information society contains a quite new type of society—a paradigm shift. Jensen (1999) has identified four various directions that for him seems to be plausible for the future: the dream society; the green society; a world of conflict; a world with no changes. He argues that the dream society encompasses the end of human kind's multi-millennium epoch of material domination and the beginning of the first postmaterialistic era. This is very much in contrast with the view that for a long time people will fight towards the so called digital divide.

The most quoted research during the latest years has been Castells' book on the Network Society. In his latest book (Castells, 2001), he analyses the digital divide from a global perspective.

From the convergence theory (Figure 1) and associated empirical research together with the sociological theories mentioned above on ICT and societal change, the conclusion can be made that up to the beginning of year 2000 there is a continuity as well as new paradigm shift. In other words there are opportunities to influence the direction that will dominate in the future. The question is rather if people are able and willing to engage themselves on various levels of actions.

Theories in the field of this article come from many academic disciplines, academic communities, and cultures which have different perspectives and focus. What are the contributions from the IS community? For many years the focus was in development and design of information systems, and later on, the introduction and use of information systems. The tele-technology and media technology parts of the concept ICT were not addressed for many years. Some contributions after 2000 are as follows.

Melville, Kraemer, and Gurbaxani (2004) have developed a model of IT business value and thereby chose the resource-based view of the firm, which is often used in management literature and international business. They applied the integrative model to synthesise research about IT business value and developed propositions for future research in the field. The principal finding from their analysis was that IT is valuable, but the extent and dimensions are dependent on internal and external factors, including complementary organisational resources of the firm and its trading partners, as well as the competitive and macroenvironment.

Their conceptual model is comprehensive and shows the complexity of the field. It is integrative but is not interactive in the sense that interactions between theoretical levels of analysis are discussed. The following main concepts are of IT resources, technological IT resources, human IT resources, and complementary organisational resources. The other concepts are business processes and performance with focus on competitive environment: industry characteristics, trading part-

ner resources, and business processes. Within a macroenvironment are country characteristics and similar concepts.

Schulze and Orlikowski (2001) have explored the discourse on virtual organising and identified a number of metaphors which characterise various aspects of vitality. They examined the various metaphors in the practitioner-directed literature on virtual organising and concluded that the discourse contained a multiplicity of different metaphors. The identified metaphors were virtual organising as a platform, as existing in space, as composed of bits, as operating as a community, and as engaging in a network of relationships. They suggest that due to the absence of experiences to guide practice, these images are shaping people's views of and actions towards virtual organising. They then analysed these metaphors with regard to aspects of organising, meaning, source, examples, affordance, and challenge. From the conclusion that metaphors are powerful tools of social constructions, they mean that researchers and practitioners should be aware of the critical implications and of unintended consequences.

Another strand of research in the IS literature is user acceptance theory (Davis, Bagozzi & Warshaw, 1989). Van der Heijden (2004) discusses the differences in user acceptance models for productivity-oriented and pleasure-oriented information systems, hence emphasising various values.

In response to the criticism of IS research different types of approaches have been applied, for example, grounded theory, use of the discipline ethnography, structuration theory, and activity theory to study the design, development, and use of ICT.

Networks of various ICT related academic schools sharing some common perspective form world-wide networks, for example, Network for Value Sensitive Design, Community Informatics Research (CIRN), The International Conference on the Social and Ethical Impacts of Information and Communication Technologies (ETHICOMP).

In summary, critical research has been more common outside the IS community, but this is changing. Walsham (2005) argues the need for IS research which is critical and aimed at making a better world with technology. He draws implications for actions in terms of research agenda, teaching activities, publishing, and institution building. A better world with ICT should not mean better in purely economic terms, but also related social and spiritual welfare globally. A critical approach is, according to Walsham, a perspective that includes, for example, the social construction of "truth", historical and cultural contingency, and power relations. He concludes that global futures in general, and the IS field in particular, are not predetermined, but result from our own efforts and actions.

## FUTURE TRENDS

People are living in a society deeply and broadly affected by the new technology. It might be harder to identify both risks and opportunities at present and for the future. A new generation exists, which has grown up in the digital environment. There are reasons today to go back to classics in research; for example, there are no more work environments in the traditional sense – they are dissolving, although phenomena identified in research in working life, in which the Nordic Countries were very active for many years, have to be reviewed with a new perspective. How are the human needs of influence, belonging, and meaning met in the new structures and communication patterns?

Regarding "Effects on Humans" (compare Figure 1), important questions for the future are: how is ICT changing our identity and self-perception, social competence, creativity, integrity, trust, dependency, balance between emotional and rational components, balance between female and male, and involvement and alienation?

One way to summarise the discussion on the ICT society and the individual is to address psychosocial processes. These could be formulated as research questions or policy statements. By now there are reasons to start up normative research which later on could be discussed across wider cultures. It concerns the classic question if research is value-free, which at an early stage was challenged by many scholars and with strong arguments.

- Normatively, ICT should contribute to enrichment in the social contact between people and should be used to prevent social isolation and facilitate integration.
- ICT should contribute to a greater autonomy for the individual and prevent stress reactions. Control or freedom is a classic issue often described in the terms of "privacy, integrity".
- ICT should facilitate information access for all and support individual learning, but at the same time prohibit various kinds of overload, for example, information overload and contact overload.
- ICT should contribute to the deepened development of true human qualities and be used to provide time for people to develop themselves as human beings.
- ICT should contribute to both environmental sustainability and human sustainability.

- E-conflicts must be avoided. E-cooperation and peace is a major goal.

In the Vilnius Declaration at the *World IT Forum,* the major goals are seen as:

- *Bridging* the digital divide between rich and poor in the world, urban and rural societies, men and women, and different generations
- *Ensuring* the freedom of expression enshrined in Article 19 of The Universal Declaration of Human Rights and other such instruments
- *Reducing* poverty through the use of education and ICT
- *Facilitating* the social integration of excluded segments of societies
- *Respecting* linguistic and cultural diversity
- *Fostering* the creation of public domains with full respect of intellectual property rights
- *Supporting* communities in fighting illiteracy
- *Encouraging* e-governance and e-democracy initiatives
- *Improving* the quality of life through effective health service systems
- *Protecting* the local and global environment for future generations

There are academic discourses on most of the concepts embedded in the main goals above, for example, digital divide, sustainability, integration, quality of life, and e-democracy. Theories and empirical research in the field have to be balanced with action-oriented, value-oriented research.

WSIS (World Summit on the Information Society) is an opportunity for a wide range of actors to develop principles and prioritize actions that would lead to democratic, inclusive, participatory, and development-oriented ICT societies at the local, national, and international levels. Meetings will continue.

## CONCLUSION

With distributed computer power, strong telecommunication (for example, the Internet) and mobile equipment, there is an inherent opportunity for deepening democracy and strengthening individuals and their influence on society. However, there is also an increasing risk of enforcing centralisation and misuse of power. Issues on organisational design and management—especially classics in participation design—are now important areas for R&D, and are valid not solely for the working life and professional role. The organisation and management of our role as private persons and as citizens are becoming crucial.

Within disciplines such as Informatics a discussion of focus in research and development is taking place. Both analysis and design need to address not only the work process and management connected to the sphere of production life, but also people's life environment and the psychosocial life environment. Not only professional roles, but also our roles as citizens and private persons are going through a deep change. Community research in a broad sense comes to the fore, with respect to both physical and virtual communities. Analysis and design of ICT and societal systems at the local level and globally become important. There is also a need for new and additional actors at the deeper and broader integration of ICT in the society (children, elderly, and consumer organisations). Educational programs on community informatics and social informatics are appearing in many academic institutions.

Many academic communities are addressing the complex issue of "ICT and Work Organisation and Society", for example, ODAM within IEA (Organisational Design and Management), ETHICOM, CIRN, CSCW society, and subtracks within HCII (Human Computer Interaction International), and Working Groups within IFIP (International Federation of Information Processing). ECIS (European Conference on Information Systems) and the correspondent international ICIS (International Conference on Information Systems) are becoming more open to these issues during the latest years. Research becomes easily fragmented and hard to overview. However, new journals are appearing with a broad cross-disciplinary perspective. New centres are established, and widening definitions of disciplines are occurring in parallel with a harder specialisation, especially within electronics and hardware. Hopefully this article will serve as opening the door to a field of research with accelerated speed of change and complexity. There is a need for a much stronger support internationally for cross-discipinary, cross-cultural, and action-oriented research on the topic, "ICT for Deepening of Humane and Societal Qualities".

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## KEY TERMS

**E-Society:** A coherent term referring to a society where information and communication technology deeply and broadly have penetrated and become integrated in the society and its substructures, for example, workplaces, homes, authorities, communities with use of the present terminology, which in the next step could be changed. The prefix "E" refers to electronic communication and/or electronics. Other similar terms used are ICT society, digital society, information society, and computer society. Electronic society or e-society can involve societies that use electronic communications technology over a broad spectrum, for example, the Internet, extranet, e-mail, e-books, databases, and mobile phones.

**Convergence:** Convergence here means a move towards a common content.

**Net, The:** *Net* may mean fibers woven in a grid-like structure, as in fishing net or crocheted cloth. It most often refers to the network (see Network) or Internet (see Internet). In this article it mainly refers to a virtual place where digital information is transmitted and stored and where digital communication has taken place. The term is used for the hardware, software, and structure.

**Network Organisation:** A computer network is a system for communication between computers. These networks may be fixed (cable, permanent) or temporary via, for example, modem. To network is to interact socially for the purpose of getting connections or personal advancement. Many people network for jobs and information. To get a job in the present economy, it is important to have a strong network. The Internet is the largest of the existing networks. The term network has been transferred to organisational theory and refers to organisations characterised in this article.

**Psychosocial:** Psychosocial environment refers to the process involving the interaction between the objective environment and the subjective one. Essential concepts within the psychosocial work environment include factors such as contact patterns and communication, organisational structure and design, work content and workload, participation in decision making, promotional and development patterns, salary conditions, and working hours.

**Role:** The position, task, or function a person has in a certain context and the norms and expectancies which are associated with this position or task. Every person has a set of roles which is played in various contexts, for example, professional role, private role, citizen's role.

When various roles are hard to combine, a role conflict appears.

**Software:** Computer software (or simply software) is that part of a computer system that consists of encoded information as opposed to the physical computer equipment (hardware) which is used to store and process this information. The term is roughly synonymous with computer program but is more generic in scope. Software has historically been considered an intermediary between electronic hardware and data. As computational science becomes increasingly complex, the distinction between software and data becomes less precise. Software may at present be considered an interface between hardware, data, or software.

**Stress:** Medically speaking, stress is a combination of adjustment measures that is the organisms' reaction to frustrations and other sources of irritation in its surroundings. Stress in everyday speech normally refers to the harmful reactions, even if stress also can be a positive reaction. Stress often refers to the concepts of over-stimulation and under-stimulation. Stress occurs when an individual sees a situation as threatening and cannot reduce his/her frustration by means of socially acceptable and generally appropriate behaviour.

**Work Organisation:** Refers to the structure of a working place and includes the methods used to allocate work, the basis for decision making and organisational aids. Work organisation is also a part of the social and psychosocial work environment.

# ICTs and Governance in Africa

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## INTRODUCTION

Information and communication technologies (ICTs) comprise a range of technology products and activities that enable the recording, storage, processing and retrieval, transmission, and reception of information. These products include computers, basic telecommunications services, e-mail, satellite communications, microelectronics, and the Internet. Arguably, these products and activities have found pervasive "functional inclusion" in virtually all sectors of any economy. Their use can help improve the quality of life for citizens, especially in the health, education environment, and agriculture sectors (Mansell & Wehn, 1998). IDEA (2000) asserts that ICTs and the phenomenal growth of the Internet also create new opportunities and challenges for the process of widening and deepening the process of good governance. For example, electronic communications through the use of ICTs offers the potential for greatly enhancing the transparency, efficiency and ease for sustainability of good democratic governance (IDEA, 2000).

It is apparent that though ICTs have emerged as the major engine of economic growth and international competitiveness in certain developing countries (mostly in Southeast Asia) and some of the larger developed economies, applications and developments of these technologies, however, are still at a minimal level, starting to make very small beginnings in African countries. Although there are some noticeable applications of ICTs to governance in some African countries, most of the countries are yet to grasp the underlying dynamics of ICT contribution to economic development. Of particular concern are those countries that lack the technology capacity and legal policy frameworks. The implications and importance of ICTs in different countries, thus, vary considerably in complexity, and this can be argued to be a function of the national level of technological capabilities (NLTC) available, as well as the governance regimes to guide and coordinate the efficient use of ICTs (Oyeyinka, 1997). Many of the less-developing countries (LDCs), especially in Africa, were by-passed in the earlier technological development train … largely as a result of the historical antecedent of lack of assets and technological capabilities and good governance. Rather than being further left behind, these countries have started to appreciate the fact that ICTs can present opportunities to allow them join in the new economic order, and help reduce some of the technological gap between the developed and less-developed economies (Dzidonu, 2001). Much research would seem to have gone into understanding the component of NLTC with very little done on the governance component. This article attempts to consider the application of ICTs in governance in Africa.

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### Defining Governance

Governance is sometimes viewed as the process by which a constituted government practically exercises its statutory power and authority towards achieving its set goals for society. Such perception, however, tends to minimize the importance of the role that the citizenry, as the governed, must be allowed to play in setting the dynamics and direction of governance. Accordingly, a more inclusive notion of governance is that it is the process by which people in a community govern themselves towards achieving the goal that they mutually set for themselves. This notion was aptly expressed by the Deputy Secretary-General of the United Nations, Louise Frechette, who said that governance is "the process through which institutions, businesses, and citizens' groups articulate their interests, exercise their rights and obligations and mediate their differences" (UNECA, 1999, p. 1).

According to Tiamiyu (2000), governance in society is about the communication, articulation, and sharing of vision, and the synchronization of action among various stakeholders or socio-economic groups in the society. In other words, governance is not just about the relationship between a governor and the governed, nor the mere exercise of authority by one group over others. It is the aggregate of the participation of all stakeholders and groups in the society in the economic and socio-political life of that society. According to UNESCO (2005a), governance refers to the exercise of political, economic and administrative authority in the management of a country's affairs, including citizens' articulation of their interests and exercise of their legal rights and obligations.

In developing world areas, such as in Africa, where satisfying basic necessities of life is still a challenge, the definition of governance must be inclusive. Good governance must include effective participation in public deci-

sion making and management by citizens, accountability, legitimacy, transparency, the rule of law, and an open and enabling environment for addressing socioeconomic problems. This requires participatory democracy and capacity by governments to respond to the demands of development. The capacity aspect must be emphasized, as "… a more open, participatory government is not a sufficient condition for good governance. Expression of citizen demands, whether for services, accountability, or transparency, is futile without a government willing and able to listen and respond. A democracy without effective administrative capacity is an empty shell" (Lal, Gaumer, & Manhica, 1999). As such, good governance is not only about providing an open and free political atmosphere, it also requires a government with the capacity to raise the standards of living and quality of life of the people.

## WHAT ROLE FOR ICTS IN GOVERNANCE?

E-governance may be understood as the performance of governance via electronic medium to facilitate an efficient, speedy, and transparent process of disseminating information to the public and other agencies, and for performing government administration activities. E-governance is generally considered as a wider concept than e-government, since it can bring about a change in how citizens relate to governments and to each other. The idea of adopting ICTs is to move beyond the passive information-giving to active citizen involvement in the decision-making process. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable, and empower the citizen.

The purpose of implementing e-governance is to enhance good governance. Good governance is generally characterized by participation, transparency, and accountability. Recent advances in communication technologies and the Internet provide opportunities to transform the relationship between governments and citizens in a new way, thus contributing to the achievement of good governance goals. The use of ICTs can increase the broad involvement of citizens in the process of governance at all levels by providing the possibility of online discussion groups and by enhancing the rapid development and effectiveness of pressure groups. Advantages for the government include that the government may provide better service in terms of time, and governance may be more efficient and effective. In addition, transaction costs can be lowered and government services become more accessible (Ningo, 1999).

The fields of implementation of e-governance are:

- **E-Administration:** Improving of government processes and of the internal workings of the public sector with new ICT-executed information processes.
- **E-Services:** Improving delivery of public services to citizens. Some examples of interactive services are: requests for public documents, requests for legal documents and certificates, issuing permits and licenses.
- **E-Democracy:** Creating greater and more active citizen participation and involvement enabled by ICTs in the decision-making process (Heeks, 2001).

According to Coleman (2003), e-governance offers the prospect of at least 10 major administrative and democratic improvements:

1. Cheaper and more effective management and processing of information
2. A freer flow of information between departments, agencies and layers within government
3. More professional administrators, supported by standardized, electronically embedded decision-making systems
4. The routine provision of services according to impersonal rules, as opposed to client list arrangements
5. Transparency, particularly in relation to the procurement of government services
6. Opportunities to work in partnership with the private sector in modernizing governmental processes
7. A freer flow of information between government and citizens
8. The strengthening of intermediary democratic institutions, such as parliaments, local government, civil-society organizations (CSOs), and independent media
9. Opportunities for citizens to participate more directly in policy development
10. Opportunities to combine traditional and modern methods of accountability

## African Governance and ICTs: Some Reference Points

According to Coleman (2003), successful e-government initiatives can have demonstrable and tangible impacts on improving citizen participation and quality of life as a result of effective multi-stakeholder partnerships. There are many examples of successful African e-governance

projects, often implemented in isolation from broader strategies for sustainable e-governance. According to Coleman (2003), the strategic programs for e-governance have been established recently in countries such as Egypt, Kenya, Senegal, Mozambique, and South Africa. These strategic initiatives indicate that African e-governance is moving beyond the stage of novel experimentation. As in Europe and North America, African governments are proceeding pragmatically and incrementally towards e-governance, but they are increasingly doing so within a framework of established good practices and strategically articulated objectives (Coleman, 2003). Some examples of the wide range of relatively successful African e-governance projects are highlighted next.

The Information Technology Standards Association (ITSA) of Kenya launched an Electronic Graft Management pilot project, whose aim is to increase public awareness and encourage public participation in fighting corrupt practices. According to Onunga (2004), the pilot project intends to use the Internet and e-mail as the channel for communication by the public for reporting. The idea is to introduce the use of an Internet hotline, popularly known as an online reporting mechanism. For the pilot project, the existing Internet infrastructure that currently covers six major towns will be used. Existing Internet cafés and e-touch centers in these towns are to be used by the public for reporting, at no cost. In addition, two remote locations, which do not have the required infrastructure, will also be set up to test the feasibility of connecting larger rural areas. The EGM Centre will filter information electronically and forward/channel it to relevant authorities for action. The partnerships are currently being formulated between ITSA and the relevant authorities. The greatest challenge facing the implementation of the project is how to make the public report genuine corruption voluntarily (Onunga, 2004).

Nigeria has commissioned a new Online Project of the Corporate Affairs Commission (CAC). The project was informed by the need to transform the Commission into a more efficient and effective companies registry (UNESCO, 2005b). Also, in Nigeria, there is the Nigeria Congress Online, a Web site that is a fusion of all issues of interest relating to and impacting all aspects of governance, namely the presidency, state/local government administration, the legislature, and the judiciary. It also serves as an interactive forum for interface between the Nigerian government and other stakeholders of democracy (The Nigeria Congress Online, 2004). The objectives of the site are: the promotion and sustenance of democracy; promotion of transparency in government; facilitation of awareness and interaction between the government and the people; encouragement of basic constitutional, human rights and freedoms; and service as a repository of knowledge and parliamentary history data. In Ethiopia, there is the establishment of distance learning for civil servants. There are approximately 350,000 civil servants in the Ethiopian government, of whom 14% have PCs and less than 1% have e-mail access. The World Bank's Global Development Learning Network has established a peer-to-peer video-conferencing and distance learning center in Addis Ababa to train civil servants in the use of ICTs (Coleman, 2003). Zambia has developed the Zamlii—an online Zambian legal information portal, which is a comprehensive online collection of documents and research relating to Zambian legal and constitutional issues, intended as a legal network for lawyers, judges, academics, students, and citizens. Also, there is the Parliamentary Technical Assistance Project in Uganda, which was introduced in 1998 to assist the Parliament of Uganda with its own modernization process so elected members can better represent the interests of their constituents, make better laws and provide more effective oversight of the executive.

Another e-government project is the Kubatana Trust of Zimbabwe, which aims at strengthening the use of e-mail and Internet strategies in Zimbabwean NGOs and civil society organizations. Kubatana hopes to make human rights and civic education information accessible to the general public from a centralized electronic source. The objectives of the project are to develop a central Zimbabwean development and human rights portal. The portal will contain editorial material highlighting the work of the organizations hosted on the portal, develop an electronic fact sheet for each organization hosted on the portal, develop an e-activism page for online campaigns, and link existing Zimbabwean NGO and civil society Web sites to the portal. By focusing solely on Zimbabwe and being committed to the regular updating and development of the portal, it is believed that Kubatana will become the most important source of Zimbabwean human rights and development information on the Internet.

Furthermore, in South Africa, there is the Cape Gateway portal, which provides Web-based information about government services and departments, structured according to users' life events. There is also the Independent Electoral Commission voter registration system, which is a satellite-enabled network that allows the Commission to register voters, collect and verify ballots, and relay election results across the country. According to Adesida (2001), Ghana is a success story in its efforts toward applying ICTs toward reducing poverty and improving governance. There is the Environmental Information Network, a project that aims to strengthen effective networking between various environmental agencies and NGOs in Ghana (Coleman, 2003). Finally, the urban information system in Senegal allows free Internet access to people in a Dakar neighborhood, with special services that make it easier for residents to communicate

*Table 1. Internet penetration in Africa and rest of the world (www.internetworldstats.com, 2004)*

| World Regions | Population % of World | Internet Usage, Latest Data | % Population (Penetration) | World Users (%) |
|---|---|---|---|---|
| Africa | 14.0 % | 13,468,600 | 1.5 % | 1.5 % |
| Asia | 56.3 % | 302,257,003 | 8.4 % | 34.0 % |
| Europe | 11.4 % | 259,653,144 | 35.5 % | 29.2 % |
| Middle East | 4.0 % | 19,370,700 | 7.5 % | 2.2 % |
| North America | 5.1 % | 221,437,647 | 67.4 % | 24.9 % |
| Latin America/Caribbean | 8.5 % | 56,224,957 | 10.3 % | 6.3 % |
| Oceania/Australia | 0.5 % | 16,269,080 | 48.6 % | 1.8 % |
| WORLD TOTAL | 100.0 % | 888,681,131 | 13.9 % | 100.0 % |

with local government agencies. It also generates local content. Another program using ICTs to improve governance also originated in Dakar. It was designed to improve the quality of parliamentary debate on ICT policy, plus, it educated members of the Senegalese Parliament about the implications of ICTs for development and opened possibilities for members of Parliament to access information on other subjects.

Having the above reference points of ICTs' use in governance in Africa in mind, we discuss in the next section some of the challenges and future trends of the application of ICTs to governance in Africa.

## CHALLENGES AND FUTURE TRENDS

We assume in this article that ICTs could play a significant role in improving governance in Africa by enlarging the democratic space, enhancing dialog, facilitating inclusiveness and providing governments the tools to better perform their administrative and management functions. However, despite the capacity of ICTs to facilitate communication and bring people together, they also have become another dividing factor. In Africa and much of the world today, there is a "digital divide" between and within nations. Africa is at the bottom of the ladder of the information society compared with other continents. Within African countries, a major divide is emerging between the relatively "information-rich" and the abjectly "information-poor." This division is probably more pronounced, as only a very few can afford to be linked to the global information highway. Reasons vary, but the most important are: poverty and lack of education. The cheapest Internet computer today is about $300 (United States (U.S.) dollars) in the U.S. In Africa, despite the fall in prices and market liberalization, the cheapest computers retail for about $1,000, which doubles the average per capita income for most Africans. In addition to a computer, one needs a telephone line and Internet Service Provider (ISP) to participate in the information society. For the majority of Africans, telephone is a luxury, which is either not affordable or not available. Waiting time to get a telephone line in Africa could run up to 10 years at a cost of more than $1,000 per line. Even when the line is available, the charges are the highest in the world. African ISPs are also scarce, expensive, and unreliable.

From Table 1, it is obvious that the rate of access for each of the regions does not match global population figures. Sub-Saharan Africa, which has 13% of the world's population, has only just more than 1% of Internet users, whereas 5% of the world's population, in North America, constitutes almost one-third of total Internet users. Literacy rates are low in Africa, also, with too many people unable to read or write. Even when one can read, ICTs require training to be able to use them effectively. Despite novel ways of providing access through community centers and sharing of access, these factors conspire to keep the financially poor from joining the information society. For the most connected country in Africa, South Africa, less than 5% of its population has access from home to the Internet (The Economist, 2000). Also, the infrastructure necessary for globalization is inadequate in Africa, while financial resources are becoming more and more limited. As pointed out by Mansell and When (1998), "the most basic telecommunication infrastructure is still absent, unreliable and/or very costly" (Mansell & When, 1998). In addition, power supply is a major problem. In many cities where there is electricity, power supply is unreliable, and in most rural areas it is simply not available.

According to Aiyepeku (2005), with regard to ICTs and its application in government business, the uncoordinated status of "ICTs for governance" in Africa may be characterized as follows: Africa has been essentially at the receiving end of well-meaning, largely exogenous initiatives aimed at mainstreaming ICTs in the region's development processes; most African ICT-in-the-development-process initiatives, so far, have been little more than pious hopes and random "success stories," with rare empirical evidence of long-term applications in specific

African development environments. In addition, critical resource inputs—intellectual, technological and financial—into most ICT-for-African-development projects have invariably followed a rather predictable, uniform model, irrespective of the widely differing infrastructure, cultural, and political contexts of beneficiary African states. Aiyepeku (2005) submitted further that the commitment of most African states to the cause of mainstreaming ICT into governance and indeed the development process has been typically long on words and resolutions, but painfully short on *a comprehensive package of systematic actions, with measurable indices of progress towards the attainment of discernible objectives/goals.*

While the barriers to creating the information society in African countries are high, the opportunities for connection are growing. In telecommunications, a substantial increase in the rate of expansion and modernization of fixed networks is taking place, along with the explosion of mobile networks. The number of main lines grew about 9% a year between 1995 and 2001; however, this is off a very low base—the overall fixed-line teledensity as of 2001 was still only about 1 per 130 inhabitants in Sub-Saharan Africa (excluding South Africa). Overall, the number of fixed lines increased from 12.5 million to 21 million across Africa between 1995 and 2001. North Africa has 11.4 million of these and South Africa another 5 million, leaving only 4.6 million line for the rest of the continent. The sub-Sahara thus contains about 10% of the world's population (626 million), but only 0.2% of the world's 1 billion telephone lines. Comparing this to all of the low-income countries, (which house 50% of the world's population and 10% of the telephone lines), the penetration of phone lines on the sub-continent is about 5 times worse than the "average" low-income country (Jensen, 2002). It should be noted that there is a high level of variability between countries and regions, even within the sub-Sahara.

## CONCLUSION

In this article, we explored the role of ICTs in governance in the continent of Africa and submitted that its use in governance offers the potential for greatly enhancing the transparency, efficiency, and ease for sustainability of good democratic governance. Also, we pointed out that ICTs are not an end, but are means and tools that offer opportunities to improve governance in Africa, especially by enlarging the democratic space, enhancing dialog, facilitating inclusiveness, and providing governments the tools to better perform their administrative and management functions. Some reference points of the application of ICTs to governance in some African countries were highlighted, as well as the challenges inhibiting the successful application. This article noted that although there are some noticeable applications of ICTs to governance in some African countries, most have not yet fully grasped its underlying dynamics. We conclude that by applying ICTs to governance, African governments have a lot of opportunities to avail themselves of and, indeed, the future of ICTs' application in governance is very bright, provided African governments take drastic steps targeted at surmounting the challenges highlighted above.

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## KEY TERMS

**Africa:** Africa is the world's second-largest and second most populous continent, after Asia. At about 30,360,000 km (11,722,000 square miles) including its adjacent islands, it covers 5.9% of the Earth's total surface area, and 20.3% of the total land area. With more than 840,000,000 people (as of 2005) in 57 territories, it accounts for more than 12% of the world's human population (Wikipedia, 2005).

**E-Governance:** E-governance implies the use of ICT channels to change the way citizens and businesses interact with government to enable citizens' involvement in decision making, increased access to information, more transparency and civil society strengthening (Schware & Deane, 2003).

**E-Government:** E-government refers to the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees.

**Good Governance:** Good governance refers to governance that is participatory, consensus oriented, accountable, transparent, responsive, effective, and efficient, equitable and inclusive, and follows the rule of law. It assures that corruption is minimized, the views of minorities are taken into account and the voices of the most vulnerable in society are heard in decision making. It is also responsive to the present and future needs of society.

**Governance:** Refers to the process of decision making and the process by which decisions are implemented (or not implemented). Governance can be used in several contexts, such as corporate governance, international governance, national governance, and local governance.

**Information and Communication Technologies (ICTs):** Encompass all forms of technology used in processing and disseminating information.

# Identification in E-Government

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## INTRODUCTION

Official procedures usually require that the citizen is unmistakably identified. This may be needed to ensure that the person approaching the authority is the one that has filed an application such as tracking the status of a request, for exercising certain rights such as representing a company or being a party in a proceeding, or for ensuring that the person is eligible to receive certain information such as her penal record. We define identification as the process necessary to validate or recognize identity.

In addition to identification, authenticity of a declaration of intent or act is needed in order to establish assurance of the purported identity. In conventional paper-based processes with personal appearance identification is usually carried out using identity cards, deeds, or witnesses. Authentication is provided by handwritten signatures.

When in e-government official processes are carried out electronically, both identification and authentication remain important aspects and need to be supported electronically. This may be provided by introducing electronic substitutes of paper-based official documents and handwritten signatures. At first glance, electronic signatures, digital certificates, and public key infrastructure (PKI) are such means. The legal basis for electronic signatures exists, for example, at the E.U. level (Signature Directive, 1999) or by national signature laws such as (Signature Law, 2000).

However, some issues need to be considered when introducing identification models for e-government on the regional or national level. These issues include scalability, durability, sustainability, and last but not least data protection and privacy. In this article we discuss these issues on identification in e-government. Therefore, the requirements on identification are sketched in section "Requirements of an Identification Model." Section "Identification vs. Electronic Signatures" continues by highlighting what shortcomings an identification model solely relying on electronic signatures and PKI faces. Section "Approaches to Electronic Identification" gives an overview of what solutions have been proposed and section "Fragmented Identifiers to Preserve Privacy" deepens one approach by introducing the model that has been followed by Austria (E-Government Act, 2004).

## REQUIREMENTS OF AN IDENTIFICATION MODEL

When introducing an identification model for e-government usually a number of considerations are being made. Irrespective of whether the identification model is being introduced on a national, regional or municipality level, unique identities shall be supported as this is needed by many official processes. The model also should support permanent, preferably lifelong identifiers that resist changes of names and so forth. This ensures that a citizen can be identified within a certain process irrespective when the identification is needed. Land registers are an obvious example where identification may be needed for quite a while.

In particular on the large scale, establishing the identity based on features such as name and date of birth is not sufficient, as widespread names may lead to digital twins. Thus, scalability is a further issue. Related to scalability, an aspect that shall not be underestimated is that systems that work well with early adopters that usually are technology-educated may turn out to not scale when the technology is taken up generally. An example—aside from security considerations—are usernames and passwords that tend to become costly on the large scale, as forgotten passwords and helpdesk costs become an issue. This particularly holds for e-government, as most citizens have official business rarely—in many cases once a year or less.

When obtaining an electronic identity linking to a physical person might require personal appearance to proof the identity by conventional means, such as identity cards. It however is hard to argue that a registration needs to be done with every authority that aims for introducing e-government. A single registration requiring personal appearance should suffice. Moreover, an identification system should be interoperable between

*Table 1. Overview of identification requirements*

- Unique identification: Citizens shall be unmistakably distinguished from others
- Durability: Permanent identifiers should be supported
- Scalability: Digital twins shall be avoided even in large scale environments
- Maintainability: The system shall, for example avoid forgotten identifiers if rarely used
- Single registration: A single show-up to obtain an electronic identity suffices
- Interoperability: Identification shall work in various administrative domains
- Privacy: Data protection shall be maintained

administrations, preferably taking cross-border processes into account, so that the citizen can use his electronic identity with different authorities.

Interoperability and cross-administrative usage of electronic identification comes with a connotation putting privacy at stake, as unrelated cases might be linked. This raises data protection concerns, in particular with nation-wide identifiers.

Table 1 summarizes the requirements that have been identified above.

## IDENTIFICATION vs. ELECTRONIC SIGNATURES

For unique identification an identifier of the person is needed. This unique identifier needs to be linked to the electronic signature to allow the relying party—usually the public authority in case of e-government processes—to verify that an electronic signature has been created by the claimed identity. If considering electronic signatures as the sole means of identification, the link between the physical person and the electronic signature is provided by the digital certificate.

However, data that is usually included in digital certificates—if using qualified certificates following the E.U. Signature Directive (Signature Directive, 1999) at least the name or a pseudonym—are not sufficient for uniquely identifying a person, as there might be digital twins, that is, two persons holding the same name. Even when amending the name by the date of birth and the place of birth, the digital twin problem isn't necessarily avoided. Even in a relatively small country such as Austria with a population of about 8 million several hundred citizens having the same name and date of birth exist. Moreover, the name may change over time such as due to marriage, thus processes started under the former name no longer can be identified solely relying on a certificate. Further problems that arise are that the spelling of names may not be consistent which affects the data quality that can be gained.

An option alleged useful might be to use the serial number of the certificate which per definition should be unique. Still several problems exist: First, a citizen might have several certificates each having different serial numbers that need to be linked to one person. Secondly, the certificate might expire or be revoked and thus no permanent identifier is given.

## APPROACHES TO ELECTRONIC IDENTIFICATION

Unique personal identification numbers (PIN) are a tool of choice to avoid the digital twin problem. However, data protection is a concern, as, for example, the E.U. (Data Protection Directive, 1995) explicitly refers to national PINs when asking the Member States to determine "the conditions under which a national identification number or any other identifier of general application may be processed." The solutions followed by Member States vary significantly—also depending on culture and historically grown approaches: Using the national PINs within E-Government processes is accepted in some countries. Similarly the tax numbers or social security numbers may be used in others. For data protection reasons, such an approach is however considered unacceptable in several countries.

When linking unique identifiers to the electronic signature for authentication purposes, several options exist: From a theoretical perspective, this can either be done explicitly by holding the PIN with the data needed to create the electronic signature—the digital certificate or the signed document—or implicitly by defining a separate record that establishes the link.

Summarizing, the following approaches are worth investigating when introducing unique identification, have been proposed or even been implemented by countries, respectively:

- Introducing a permanent identifier into the certificate has been investigated by the IETF PKIX group

(Pinkas & Gindin, 2004). An example of introducing a permanent identifier into the certificate is the Italian "InfoCamere" signature card of the Italian Chamber of Commerce where the tax number is stored in the certificate.

- Even if a unique identifier has already been introduced by a country, adding this to electronic identity media such as citizen cards might have been avoided for data protection reasons. For example, although people from Finland have personal identification numbers issued at birth, the Finnish FINEID card does not store that number, but a unique electronic ID (Partanen, 2003) that does not reveal information of the holder. The unique electronic ID however might be argued as a unique identifier stored in the certificate.
- Data could be added to the certificate that eases unique identification, for example, the gender, the date of birth, the name of birth, maiden names, or the name of the parents. The proposals in many cases follow the data that also is given in national identity cards. When changing to electronic identity this however raises data protection concerns, as directory services of certification service providers are usually public data.
- Using a separate record to establish a link between the unique identifier and the electronic signature has been chosen with the Austrian citizen card concept (Leitold et al., 2002) which is discussed in more detail in the following section.

## FRAGMENTED IDENTIFIERS TO PRESERVE PRIVACY

As one example of using unique identity and at the same time taking data protection aspects into account the Austrian identification management model is sketched in this section. The legal basis of this model together with the basis of the Austrian citizen card has been enacted as (E-Government Act, 2004).

Austria has introduced a national Central Register of Residents (CRR) in 2001. This forms a basis for electronic identification of residents. Together with registers for legal persons—the Register of Company Names and the Register of Associations—a data basis for natural and legal persons falling under registration obligations is provided. To cover citizens that are not registered in the CRR, for example, cross-border commuters or expatriates, a Supplementary Register has been introduced to which citizens or foreigners may apply for inclusion.

The identification model followed is based on the idea that within a certain sector of state activity no immediate data protection problem exists due to the introduction of unique identifiers. This is common practice as, tax numbers provide unique identification within the tax system or similarly social security numbers provide unique identification within the health insurance or social security system. Data protection concerns arise when data is exchanged between sectors of state activity where the cases are not related. Thus, such communication should be controlled—still basing the identification model on single sources is useful.

To provide that goal, the Austrian model introduces a so-called identity link where a base number is cryptographically derived from the before mentioned registers and stored on the citizen card. The identity link is a data structure signed by the public authority that asserts that a permanent identifier—the base number—relates to a certain certificate. By using a separate structure, the identity link is under control of the citizen and can be kept confidential. The citizen may also possess various citizen cards—having different certificates but linking each to the citizen's unique base number via a dedicated identity link.

The model defines a set of sectors of state activity where a single unique identification number may be used from a data protection perspective—some 30 such sectors have been defined in Austria (e.g., tax, health, etc.). When a citizen identifies herself in one sector of state activity, her citizen card combines an identifier of the sector with her base number in the identity link and applies a cryptographic one way function. This results in fragmented PINs where the citizen is uniquely identified in a certain sector, but the identification in one sector cannot be used in a different sector to identify the same citizen. Where such interadministrative relations need to be established, this can be either done with assistance of the citizen who is in control of the identity link, or where legally admissible the Data Protection Commission is authorized and technically enabled to establish such a link via the source registers (e.g., the CRR).

Summarizing the approach, Austria has implemented a system where the citizen controls her identification data stored in the citizen card. Fragmented PINs that are derived from various central registers are used in a way that cross-relating unrelated databases is inhibited by cryptographic means.

## CONCLUSION

The article has discussed the importance of unique identification when carrying out administrative processes electronically, that is, when advancing to E-Government. A number of requirements have been defined that are

worth considering when establishing a nationwide identification system. Provisions and shortcomings when using electronic signatures as sole means of identification have been addressed.

Data protection and privacy have been identified as a major challenge. While the introduction of electronic identification and e-government promises benefits for the citizens, privacy should not be at stake.

A number of approaches to unique identification have been discussed. Among these, one model actually implemented has been introduced as an example of how a putative contradiction between unique identification and privacy can be met.

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## KEY TERMS

**Authentication:** The provision of assurance of the claimed identity of an entity.

**Certification Service Provider:** An entity who issues digital certificates.

**Digital Certificate:** An electronic attestation which links data such as public keys to a person and confirms the identity of that person.

**Electronic Signature:** Data in electronic form which are attached to or logically associated with other electronic data and which serves as a method of authentication.

**Identification:** The process necessary to validate or recognize identity.

**Identity**: Designation of a specific person by means of data which are particularly suitable to distinguish persons from each other, such as, in particular, name, date of birth and place of birth but also, for example, company name or (alpha)numerical designations.

**Qualified Electronic Signature:** An electronic signature that fulfills the requirements to have legal equivalence to a handwritten signature (e.g., an electronic signature as defined in article 5.1 of the E.U. Signature Directive).

**Unique Identity:** Designation of a specific person by means of one or more features enabling that data subject to be unmistakably distinguished from all other data subjects.

# Immigration and Digital Government

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## INTRODUCTION

The information age of the 21st century has transformed the economic, social, and political landscape in a profound and indelible manner. It also has changed the role and functions of government and redefined the scope and substance of good governance. Never before in human history has the pace of structural change been more pervasive, rapid, and global in its context. The information age has precipitated profound structural changes in the economic landscape and has given birth to the new economy. The new global economy is composed of a trilogy of interactive forces that include globalization, trade liberalization, and the information technology and communications revolution. Globalization has melted national borders, free trade has enhanced economic integration, and the information and communications revolution has made geography and time irrelevant (Passaris, 2001). Immigration has taken on a new perspective in the context of globalization. There is no denying that the spread of Internet-based technologies throughout society has become the dominant economic reality of the 21st century. E-economy—the use of information and communication technologies for product and process innovation across all sectors of the economy—has emerged as the primary engine of productivity and growth for the global economy. In large part due to advances in information and communications technologies, the role of international borders in this globalized economy has been transformed from the traditional geographical frontiers to virtual economic communities.

Innovations in transportation and information and communications technology also has impacted immigration flows and made the world, in the phrase coined by Marshall McLuhan (1988), truly a "global village". Borders have become less relevant for digital content communications and transactions. Cyberspace has no natural demarcations or border patrols. Indeed, knowledge-based products, such as software, games, and music, cross borders without impediment and with relative ease (Passaris, 2003).

The advent of the information age has had a profound impact on the nature and scope of e-government and has given birth to the digital government of the 21st century. In particular, the interface between government and immigration management has been redesigned and restructured in terms of access to immigration information and application forms, the processing of immigration applicants for admission, enforcement of security measures and the prevention of terrorist infiltration, and the time line for adjudicating immigration applications, to name just a few of the significant changes to the contemporary process by which the governments of immigrant-receiving countries enforce their immigration policies.

## BACKGROUND

There is no denying that the information age has resulted in a significant restructuring between the interface of government and immigration. Furthermore, the new economy has altered the microeconomic and macroeconomic dynamics in the pattern and flow of immigration in the 21st century. Indeed, the most important factor driving the changes in immigration is economic globalization (Burstein & Biles, 2003). In this context, economic migrants are driving the immigration agenda in the information age.

In this borderless world, financial capital travels the world, going to wherever it can earn the highest return. Human capital has become equally mobile, much like financial capital, pursuing the highest expected return in terms of employment opportunities and financial remuneration. The flow of human capital through migration has become an increasingly important issue in this context (Passaris, 1999).

Migration flows in the 21st century are taking place in the context of the new global economy. The advent of globalization, the preponderance of regional trading blocks, and the emergence of the knowledge-based economy are the signature marks of the new global economy of the 21st century. The industrial/agrarian economic model of the past that determined the scope and substance of immigration patterns has been replaced by the pursuit of immigration for the purpose of enhancing a country's technological capacity and optimizing its human and social capital endowment. In this regard, the importance of human capital has redefined the quantitative and qualitative parameters of the modern dynamics for immigration flows. Indeed, in the current context, the

economic wealth of nations is determined not by the quantity of a country's natural endowments and physical resources but by the level of technological skills and educational attainment of its labor force (Florida, 2002).

The new century has introduced significant changes in the geopolitical landscape, which is reflected in the economic disparity between developed and developing nations on the international landscape. It is also underlined in the emergence of national security and combating terrorism as a principal priority for governments through redefining public policy with respect to immigration. It also has heightened concerns regarding the magnitude of illegal immigration.

The pattern of global migrations experienced a fundamental restructuring toward the end of the 20th century and the beginning of the 21st century. An economic realignment has taken place as a consequence of globalization, which has redefined countries of emigration and countries of immigration. This was precipitated by the profound structural changes in the economic landscape and the emergence of a new pattern of pull-and-push forces impacting migration flows. In particular, the traditional delineation of immigrant-receiving and emigrant-sending countries has been altered significantly. In this context, the leading source countries of emigration are currently the transition countries in Europe as well as the developing countries in Asia, Africa, and South America. Furthermore, countries of southern Europe such as Spain, Italy, and Greece, who until recently were countries of emigration, have been transformed into countries of immigration. It is also worth noting that the structural transformation of the national economies of developed countries and especially immigrant-receiving countries has had an indelible impact on the economic profile of recent immigrants.

## INFORMATION DISSEMINATION

A central feature associated with the microeconomic foundations of the migration process is the accumulation and dissemination of relevant and reliable information. Indeed, a necessary prerequisite regarding the decision to emigrate is the process of acquiring accurate knowledge and data that are essential precedents for an effective evaluation and assessment of the costs and benefits related to migrating (Passaris, 1989). The advent of the information age and new digital technologies have enhanced the information axiom that is relevant to the flow of immigration. There is no denying that the magnitude and quality of the economic, political, social, and cultural information and data to which prospective migrants have access forms an important component of the decision-making process leading to emigration. It is in this context that digital government has had the most profound impact.

Text in many languages and personal experiences are the two major catalysts for transmitting information and knowledge. Prospective migrants are likely to garner the information they need for a comparison between conditions and prospects in their country of origin with those in their country of destination from books, articles, pamphlets, interviews with immigration officers, holiday visits to the country of intended destination, contacts with residents of the country of destination, and correspondence with relatives and friends residing in that country of intended migration. Increasingly, this information is retrieved on the Internet from government Web sites, portals of immigration organizations, e-mails, and other forms of virtual connectivity.

## MULTICULTURAL IMMIGRATION

A feature of contemporary consequence with respect to immigration is the influx of a pronounced multicultural and multiracial flow of immigrant streams (Economic Council of Canada, 1991). It is anticipated that future immigration flows will be from non-traditional source countries and even more multicultural and multiracial in composition (Passaris, 1988). This underlines the need for a more vigorous assessment of the scope and substance of immigration information and the format of its electronic dissemination. In particular, digital government in immigrant-receiving countries will require a polyglot realignment in the immigration information provided on their Web sites, forms, and portals.

In many respects, an immigrant-receiving country's multicultural profile is a valuable economic asset and should be utilized strategically in the formulation of public policy. The presence of this multitude of cultures provides an opportunity to develop special economic relationships all over the world (Passaris, 1987b). The multicultural, multiracial, multifaith, and multilinguistic character of contemporary immigrant-receiving countries should become an important component of the scope and substance of digital government, especially in the area of immigration.

In the new global economy, multicultural immigration offers the receiving country a set of competitive strengths and enhanced economic development strategies. The multicultural skills and attributes of immigrant arrivals should be harnessed for competitive advantage in such areas of vital economic importance as enhanced international trade and export potential, building overseas business contacts, attracting foreign investments, tourist

appeal, and many other avenues of direct and indirect economic benefit. In short, the unique and valuable economic attributes of a country's multicultural human resources should become an integral component of a nation's economic development strategy and an important focus of economic growth initiatives (Passaris, 1985). On the other hand, the influx of immigrant labor from widely diverse geographical source countries raises some specific challenges related to the transfer of human capital across international boundaries. One such issue is the accreditation of overseas educational qualifications by immigrant-receiving countries and the recognition of transferable international work experience (Passaris, 1989a). All of those challenges and opportunities require a proactive approach in the development of government policy.

## INTERNETIZATION

Advances in information and communications technology of the 21st century have made possible the contraction of time and space and enhanced personal and institutional connectivity. The rapidity of change and the magnitude of the structural transformation are the hallmarks of this information revolution.

This structural transformation has had a compelling impact on the way we live, learn, work, invest, provide for our health care, entertain ourselves, access government services, exercise our democratic responsibilities, influence the formulation of public policy, and communicate with each other. Public services, banking, education, health care, and electronic commerce are at the forefront of the information revolution with the capability of accessing information, services, and products from around the world almost instantaneously (Passaris, 2001).

Internetization is a word that I have coined in order to capture the pervasive influence of the Internet and the World Wide Web in all aspects of human endeavor for our society in the 21st century. It is a process that is empowered by the information and communications technology in a borderless world with a tremendous capacity for virtual connectivity. The electronic prefix that appears before an increasing number of our daily activities, such as e-commerce, e-mail, e-learning, and e-government, is a tangible expression of the pervasive influence of the Internet.

## DIGITAL GOVERNMENT

Digital government, or e-government, refers to the use of computers and computer networks in order to improve government services and government interaction with citizens. The concept of a digital government is a recent innovation that has arisen from the widespread adoption of personal computers. While some governments have made use of computers for decades, the major impact of such use has been recognized only in the last few years. In the context of immigration, the role of e-government is multidimensional and multilayered. There is no denying that electronic connectivity has had an indelible impact on the scope, substance, and micro-dynamic elements of immigration. It also has been suggested that the use of the Internet for government services is likely to lead to greater rationalization, standardization, and the use of rule-based systems (Fountain, 2001).

The scope of digital government can be divided into several categories: (1) the personal use of computers by the public service for individual and administrative tasks such as communication, research, and word processing; (2) the use of databases to centrally store large amounts of information related to government and citizen activities; and (3) new private computer networks that connect databases and people in unprecedented ways, while government interaction with the public is facilitated by informative Web sites and by Web sites that offer the option to access government services electronically. In short, digital government can be used for two generic functions: to facilitate internal tasks and to enhance connectivity with the public.

By adopting electronic connectivity and digitalization, governments have improved numerous governance functions; in particular:

1. Government can facilitate the integration of government services across government departments.
2. E-government can help to change the delivery channels of public administration by responding to citizens' requests in a timely and efficient manner.
3. Public services can be accessed via the Internet through government portals with secure protocols. Furthermore, sophisticated e-government applications provide a citizen with the opportunity to determine the progress of his or her request through an online query.
4. Electronically mediated interaction, whether by way of e-mail, Web-enabled discussion threads, chat rooms, surveys, or yet-to-be-invented consultation mechanisms could have a significant impact on public consultations and could enhance citizen engagement in the democratic process.
5. Digital government has the potential of enabling the average citizen to become better informed about public issues and to make a more significant contribution to the public debate.

## IMMIGRATION INTERFACE

All immigrant-receiving countries have adopted extensive digital formats for the purpose of providing information and communicating with prospective immigrants. In those countries, government online has become the rule rather than the exception. Enhanced government electronic connectivity is driven by the objective of mainstreaming the immigration process and speeding up the decision-making time line. It is intended to implement a secure infrastructure and to sustain the transformation in service and business practices. It facilitates partnerships between government departments and organizes immigration information by topic. This accomplishes the streamlining of information and services in an integrated, multi-service delivery network operating across programs, departments, and jurisdictions. The range of government immigration electronic connectivity includes gateways and clusters in order to attain the goal of a horizontal delivery of information. In short, the contemporary evolution of digital government is to eliminate the complexity and bureaucratic bent of internal government processes. More specifically, it is aimed at information technology homogeneity, process reengineering, information technology rationalization, and improved interdepartment cooperation. In most cases, this takes the form of a single window of service to clients, where all government services are available to the public through one Internet portal.

Digital government has endowed the immigration process with Web sites that can be viewed in several languages and can provide immigration information for a large number of immigration streams such as business immigrants, foreign investors, skilled worker immigrants, humanitarian or refugee admissions, employer-sponsored migration, the family unification category, international adoption, entrepreneurial immigration, and so forth. Furthermore, they provide information regarding immigrating and settling in the country of destination, including information about entry requirements, permanent residency status, and application forms and fees, and specifying the format of personal, financial, and medical documentation that is required.

In the context of the structural change precipitated by the information technology and communications revolution and the speed of change, the immigration process has had to conform to a reduced time cycle through digitalization. The interface between immigration and government digitalization has taken many forms and is in constant evolution and development. The following is a comprehensive list of the features of digital connectivity with respect to the immigration process:

1. Application forms that can be downloaded from the Web site.
2. An electronic online service for completing and transmitting applications via the Internet.
3. Some government Web sites that allow for e-payments in the form of an online administrative fee payment service, which allows immigrant applicants to pay their administrative fees online at their convenience.
4. An electronic format to check on the progress of a prospective immigrants application online.
5. An online service that allows clients to submit an address or a change of address notification online.
6. Some immigrant-receiving countries require certain economic and professional attributes prior to granting an immigration visa. Those Web sites provide an anonymous online test to check if prospective immigrants meet the requirements.
7. An online service to schedule or cancel a personal meeting with an immigration official.
8. All of this with due regard for client privacy, establishing a secure connection, and authenticating the client. With the significant increase in the use of online service, government immigration departments have recorded a reduction in other forms of government interaction, such as in-person meetings, regular mail, fax transmissions, and telephone calls.

It is worth noting that most government immigration Web sites include information to assist newcomers to integrate in the economic, social, and cultural life of their country of destination. This assistance may be in the form of language instruction for newcomers or tips regarding the immigrant's integration into society in the areas of life skills and job search. Furthermore, government immigration Web sites include contacts for non-governmental organizations and community volunteer associations that assist newcomers to adapt more quickly to their new social and economic environment as well as provide guidance for health and educational services.

An important component of government online is the availability of an electronic virtual library and a publicly accessible storage facility for immigration legislation, electronic databases, policy documents, booklets, and so forth for the purpose of disseminating reliable information and facilitating the immigration process. Access to reliable and accurate sources of information is a fundamental axiom and essential prerequisite for the completion of a successful cycle for immigration and the economic and social integration in a host country.

Despite significant accomplishments in the interface between digital government and the immigration process,

several challenges continue to exist. They include foreign language coverage, content management, and consistency of information across departmental Web sites. The ultimate goal is the digital development of all online-compatible administration services, which will require the central development of compatible basic components and standards for the public administration of the digital infrastructure as well as a coordinated approach in the implementation of all three tiers of government and between government departments and agencies.

## PRIVACY AND SECURITY

The nature and scope of digital interaction between government and prospective immigrants embraces issues of privacy, security, confidentiality, and human rights. One of the principal challenges of the information age is to build a level of personal trust and security in the digital environment of the 21st century. Indeed, it is vital to adopt the principles that will help to guide governments and public organizations in confirming the identities of online parties and in ensuring that electronic communications are kept confidential and secure (Passaris, Samuel, Stanford & Dabydeen, 2000).

Legislation protecting the privacy of individual migrants as well as a publicly adhered to policy on the use of encryption technologies and security protection measures developed and implemented within government are essential prerequisites for building trust in the process of digital interface. More specifically, the principles that can help to build trust and confidence in the digitalization of government services are that (1) the responsibilities of participants are proportionate to the degree of knowledge and control that rationally can be expected of them; (2) the risks for authentication processes should be identified, assessed, and managed in a reasonable, fair, and efficient manner; (3) all participants have a responsibility to contribute to the mitigation of risk through sound security practices; (4) for the purpose of ensuring privacy, the collection, use, and disclosure of personal information in authentication processes should be minimized; (5) the disclosure requirements for participants that require authentication services should disclose information to ensure that other participants are aware of the risks and responsibilities associated with participation; and (6) government organizations and public services implementing authentication processes should make available an efficient and effective complaint-handling process.

In practice, government immigration Web sites usually record and log in the virtual presence of a visitor for statistical purposes, which is used by the governemnt department to monitor the use of the site, to discover what information is most and least used, and to make the site more useful to visitors. The information recorded includes the visitor's IP or server's address, the date and time of the visit to the site, the pages accessed, the visitor's operating system, the Web browser version and type, the time taken to transmit information to the visitor, and the previous Internet address from which he or she came directly to this Web site. It is worth noting that no attempt is made to identify the visitor or his or her browsing activities except in the event of an investigation into apparent improper use of the government department's Internet facility or when a law enforcement agency exercises a warrant to inspect the Internet Service Provider's logs.

Most applications regarding immigration can be completed at the Web site. The Internet user is asked questions about his or her name, address, zip code, e-mail, birthdate, marital status, passport details, health status, profession, countries of residence during the last years, criminal history, financial situation, and credit card details to pay an application fee. Some of those questions may infringe on personal privacy and individual human rights.

Some immigrant-receiving countries do not permit the electronic transmission of immigrant applications. Forms only can be downloaded and printed. The prospective immigrant is subsequently asked to complete the form and to send it by fax or regular mail.

The progress of an immigrant's application can be viewed after the user submits his or her family name, birth date, country of birth, and other types of personal authentication. Information on this site is sent between the applicant's computer and the government server in an encrypted format. Those government Web sites emphasize the use of secure sockets layer (SSL) protocol with 128-bit encryption that enhances the privacy of the information passing between a visitor's browser and the government servers.

Some government Web sites allow for the electronic transmission of administrative fee payments by providing credit card details. However, failure to press the close button may result in personal or credit card details becoming available to third parties.

In short, either through personal negligence or purposeful hacking, the possibility of security breaches and the public disclosure of personal and private information continue to be a serious challenge.

## FUTURE TRENDS

The contemporary scope of multicultural immigration and the anticipated increase in cultural and linguistic diversity of source countries of emigration in the future renders

the multilingual capabilities of government immigration Web sites an important issue. Chinese and English are the two most frequently used languages on the Internet. The most common languages incorporated in government immigration Web sites are English, French, Chinese, Portuguese, Spanish, Arabic, and German.

The multicultural profiling of most government immigration Web sites raises the question of cultural symbiosis. By that, I mean the extent to which specific cultural connotations are taken into account in designing the architecture of the Web site. It is common knowledge that different colors, visual icons, literary expressions, images, cultural artifacts, and so forth do not have a uniform appeal and receptivity along the horizontal spectrum of cultures and linguistic groups. In particular, direct translations of the text on immigration information from one language to another may result in comprehension difficulties and may contribute to cultural barriers.

This also applies to the choice of colors, cultural artifacts, and illustrations, which may have unintended connotations. The extent of cultural receptivity depends in large measure upon the degree of success in incorporating textual and visual cultural symbiosis. In short, great care and cultural sensitivity must be exercised in the development of government immigration Web sites in order to appeal directly to the intended cultural groups and linguistic communities.

Finally, it is important to recognize the existence of a digital divide between countries of immigration and countries of emigration. Immigrant-receiving countries are economically advanced countries with the most avant garde information technology infrastructure and per capita personal computer ownership and use. On the other hand, emigrant-sending countries are primarily developing countries with low levels of digital connectivity and computer accessibility. This digital disparity between immigration and emigration countries, while narrowing over time, remains a serious obstacle for the most effective utilization of electronic connectivity in the context of the migration process.

## CONCLUSION

The advent of digital government in the domain of immigration poses unique challenges and opportunities. The wealth of information and resources that is available in digital format has enhanced the connectivity between governments and migrants. The 21st century has underlined the importance of issues of national security, combating terrorism, and preventing illegal immigration. There is no denying that open societies are more vulnerable to illegal infiltration and terrorist acts. Internetization and the scope of virtual connectivity have embraced a globalized perspective for immigration that is without precedent. The removal of barriers to human mobility and the more pronounced streams of multicultural immigration will be the defining features of the next few decades of the 21st century.

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## KEY TERMS

**Asylum:** The granting of permanent or temporary residence for refugee movements.

**Economic Migrations:** Migration movements that are motivated by economic benefit and economic self-improvement.

**Emigration:** The movement of people out of a country of origin with the consequence of decreasing its population and labor force.

**Forced Migrations:** The forced movement of people out of their country of origin for compelling reasons of political, social, cultural, ethnic, or religious persecution.

**Globalization:** The growth of interdependence among world economies with enhanced trade liberalization and electronic connectivity.

**Illegal Migration:** Migratory movements that are not approved or sanctioned by immigrant-receiving countries.

**Immigration:** The movement of people into a country of destination with the consequence of increasing its population and labor force.

**Immigration Policy:** The overall direction of government's public policy on immigration expressed in legislation, orders-in-council, department of immigration memos, budgetary appropriations, and ministerial speeches.

**Internetization:** The important role of the Internet and the World Wide Web in all aspects of human endeavor. Internetization is the infrastructure and the medium of electronic connectivity in the information age and the new global economy.

**Migration:** The movement of people between countries.

**Migration Management:** The application of migration policies, procedures, and guidelines for the purpose of managing the numerical flow and qualitative aspects of immigration, such as the occupational composition and/or the education levels immigration flows.

**Refugees:** People who are forced to move out of their country or origin for fear of death or persecution.

**Source Country of Migration:** Countries of origin for migratory flows.

**Target Country of Migration:** Also referred to as a country of destination, it is the ultimate destination of migratory flows.

**Transition Country of Migration:** Countries that previously were under the Communist bloc and recently have embraced capitalism and a free enterprise economy.

**Voluntary Migrations:** The movement of people out of their country of origin, primarily with the purpose of economic advancement and improving their standard of living.

# Implementation of E-Government Systems in Developing Countries

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## INTRODUCTION

The introduction of e-government systems in India started out in the late 60s and early 70s with an emphasis on computerising applications for defence services, for the economic planning department, for the national census, for elections and for tax collections and so forth. The government mainly did the spending and the development was entirely done by internal information technology departments. In the 80s the National Informatics Centre was established, whose main role was to implement and support large-scale computerisation projects in India. The 90s saw the emergence of a national IT initiative by the Government of India with corresponding plans in the states. External funding was sought from agencies such as the World Bank and external parties such as NGOs and private corporations were involved in the computerisation efforts. The focus also shifted to external e-government systems that could provide services to the public.

The 90s saw a spate of e-government initiatives in India, in various states, that addressed issues of land records management through digitisation, issue of government documents to public and collection of various dues via kiosk-based centres and the use of GIS-based services for assisting agriculture. Currently, in the year 2005, the government in India is poised to spend Rs 120 billion on e-government initiatives.

The results of such efforts are not very promising, though: most e-government systems that are implemented in developing countries around the world fail, with the failure rates at over 80%. Many reasons are attributed to such high failure rates, most of which have to do with a lack of direction and continued support by the responsible government department. Projects, apparently, are conceived of as a response to the push to "computerise" from the government without a clear understanding of the problem being addressed or the adequate design of such systems. Or, projects are conceived of to address certain immediate problems without analysing the deeper causes of the problem.

The argument put forth in this article is that e-government system implementations are hugely complex processes that involve a complex set of factors; factors that have to be in place for the project to succeed. Government departments and officials are only one set of stakeholders who ensure the success of such projects, whereas a whole other set, those who use the system, are often left out of the analysis both during the design of the system and during its deployment. Further, e-government systems provide government services via an electronic intermediary where a manual provider is either removed or displaced altogether. The removal of officials, or their reentry at different points of the service chain, is a point of contention and may lead to conflict between stakeholder groups. An analysis of this potential for conflict is essential for implementation success of e-government systems.

The rest of this article examines these issues in more detail. The next section discusses the background to this research. The following section examines the main findings related to the issues highlighted above. The last section concludes the discussion and outlines future work.

## BACKGROUND

External e-government systems or government-to-citizen systems in developing countries are embedded in public spaces and deliver services that are demanded by a significant and diverse population. Their implementation success is based on neither their technical merits alone (the systems view) nor on the aspects of change management and user acceptance alone (the user view) (Markus, 1983). Such systems are embedded in a Web of relations or in a Web of interactions within a particular socio-economic context and their design and implementation requires an understanding of this context (Sein & Harindranath, 2004).

Prior research in e-government systems and ICT (information and communication technology) for development provides a basis for arguing the above theoretical approach. Information technology (IT) is best seen as an institutional actor (Avgerou, 2003) with its own myths and visions that have captured the imagination of its participant actors and the ideas and regulations that

guide the behaviour of the actors including those of resistance and subversion. In a developing country like India the needs, aspirations, and understanding of e-government is derived from a failure, in part, of governance mechanisms (Kaushik, 2004). The role and content of e-government systems arises from this context. Some examples will help to make concrete these theoretical issues.

Consider the implementation of a system for managing a rural development project (Madon, 1992). The main challenge to the implementation and acceptance of the system was the institutionalisation of the technology in the "ongoing context of formal and informal work and decision-making processes." Counter posing the "rational" development model and planning process for which the system was designed against the "real" model that emerged showed the complex interaction of caste, community, and regional complexities along with corruption and gross inefficiencies.

The CARD system also shows the complex play of stakeholders goals that prevents a system's intended benefits from being fully realised (Caseley, 2004). The system automated the process of land registration in the state of Andhra Pradesh in South India. The system was initiated by the state government to address the problems of widespread red tape and corruption in all aspects of land records access and mutation. One of the main problems was that of the presence of document writers outside registration offices who acted as the agents for corrupt officials. The CARD system was implemented in many districts and a few years after the launch, the study concluded that the system had not made things any easier for citizens as they still had to employ document writers and also pay bribes to access the system (on the other hand it had made things easier for the employees who could now locate files easily and also update them, while maintaining their corruption incomes).

Stakeholder theory enables the categorisation of those persons who are impacted by or impact e-government systems (De', 2005). Stakeholders have a "salience" that is both determined by and determines their power, legitimacy and influence on the system (Scholl, 2004). The following section identifies stakeholders from the perspective of their participation in an e-government implementation and their influence on the system.

## STAKEHOLDERS AND IMPLEMENTATION ISSUES

It is useful to view the stakeholders that impact the eventual success of a system as belonging to the demand-side, those who will consume the services of the system, or to the supply-side, those who fund, design, implement, and maintain the system. Individuals, groups, and organisations belong to either stakeholder group according to their relationship to the system. These categories can overlap, that is, there could be individuals or groups who belong to both categories.

It will be observed that most e-government systems implementations in developing countries are driven by the supply-side, who design the services, the processes and the architecture of the system without consulting any demand-side stakeholders. Supply-side stakeholders dominate the implementation process and are mostly informed by their own ideological commitments or by the technological imperatives of their commercial partners. They have control over all the resources and deploy them according to their understanding of demand-side needs.

Demand-side stakeholders consume the services of the e-government system and, on occasion, provide the revenues that sustain the systems. There are instances where demand-side stakeholders such as citizen's groups and civil society groups have demanded that they be included in the implementation process but this is rarely achieved. They decide the eventual success of the system through use or non-use and are directly impacted by the service efficiencies achieved.

### Example of Bhoomi System

To understand the different stakeholder groups let us consider the Bhoomi system that was implemented in the state of Karnataka in South India, and was launched in all districts of the state in 2001 (De' & Sen, 2004). It essentially allows farmers to receive a record of their land holdings at a reasonable price and also enter requests for mutations into the system. Land records are maintained electronically and details about crops are updated thrice a year. Farmers may obtain a Record of Rights, Tenancy and Crop (RTC) certificate from the system for a nominal price (Rs 15, about USD 0.33). This system replaced a manual system that was maintained by village accounts and was reportedly hard to access owing to corruption and red tape.

Neither demand-side nor supply-side stakeholders, for the Bhoomi system, form a contiguous group, there are further divisions of the stakeholders depending on their interaction with the system (see Table 1). For the demand side the primary users are the farmers who have records in the system and who use the system extensively. Till October 2004, over 22 million farmers had accessed the system since inception. Farmers use the certificates mostly to access loans from banks, along with using it as a surety in courts, for checking the details of their data, and for use in selling or mutation. With the advent of a faster process

*Table 1. Suppy-side and demand-side stakeholders for Bhoomi system*

| *Supply-Side* | *Demand-Side* |
|---|---|
| Village Accountant<br>Revenue Inspector<br>Computer Operator (or new VA)<br>Case Worker<br><br>Shirestedar<br>Tehsildar<br><br>Chief Minister<br>Secretary of Revenue Department | Farmer<br><br>Banks<br>Courts<br>Police Stations<br><br>Agriculture Department<br>Revenue Department |

of obtaining the certificates, banks have an increased possibility of doing business (of giving loans to farmers) and they are the secondary demand-side users. Other secondary users are courts and police stations. On the supply side, the primary users are the kiosk-operators (new village accountants) who run and maintain the system at the local level, the old village accountants who provide update data, caseworkers who assist farmers and revenue inspectors who are required for mutations of records. At the secondary level are the Tehsildar and Shirestedar (district officials) who also participate in the mutation process. At the tertiary level are the owners of the system such as the Secretary of the Revenue department, the Chief Minister of the state and others who are the top management that championed the project and whose work is indirectly assisted by the system.

## Analysis

With this understanding of stakeholders, a complex e-government intervention like Bhoomi can be analysed along various perspectives. The first, and most common, point is that demand-side stakeholders are rarely included in the design of the system. None of the farmers or banks or other departments were included in the design phase of the implementation of Bhoomi. Design and implementation was carried out entirely by the Project Champion and the implementation team that consisted of a government agency and some private players. The design imperatives were on issues such as data protection, access protection, standardisation of the data format, and uptime guarantees of the system. What was left out of the design were the usage considerations such as difficulty or ease of the users in accessing the system, the reasons why the users buy the certificates from the system, the interconnections with banks and courts that could have been possible and the subtle nature of user access (the ability of farmers to come to district or sub-district headquarters to access the system). Information systems literature highlights the role of user involvement during the design phase of systems, however in most cases of e-government systems such a practice is not followed.

Most e-government initiatives in developing countries sustain the levels of intermediation on the supply side. For instance, in Bhoomi, the traditional role of the old village accountant (VA) is replaced by the new village accountant (kiosk operators) who, for a fee, enter data by the farmers and print out the RTC certificates. The old village accountants were people who lived in the villages (there was usually one VA for three villages) and were known to farmers. The new VAs are unknown operators who are also government employees but their kiosks are at sub-district headquarters which is usually a half-day journey away for a farmer. There was no attempt by the designers to remove the role of the VAs initially, by providing automated or private/commercial kiosk-operators, or to enhance their roles to increase functionality. Sustaining traditional roles is a deliberate political choice, apparently to reduce resistance to the systems, as in the case of the CARD system (Caseley, 2004). However, in both Bhoomi and CARD the designers have tried to change the systems after implementation and pressure from various demand-side stakeholders for reform.

In situations where the intermediation by government officials is changed by the introduction of a system, the attempt is to increase the role of high-level officials in transactions. For instance, in the Bhoomi system the district-level official, the Tehsildar, was introduced in the land record mutation process whereas in the prior manual system this official only had to consider escalation cases. This aggregates control and power at the level of the Tehsildar at the district-level, reducing the power of revenue inspectors, village accountants, and Shirestedars. This re-intermediation poses the problem of conflict that could arise owing to the redistribution of power amongst stakeholder groups (Markus, 1983).

*Figure 1. Stakeholder conflict*

| | Supply-side Stakeholder | Demand-side Stakeholder |
|---|---|---|
| Intermediation | Increase or keep same | Decrease |
| Design | Include | Exclude |
| Control over data | Increase | Decrease |

## FUTURE TRENDS

The framework of stakeholders developed above provides a means by which a careful analysis of the complexities of e-government systems implementation can be performed. Further research along these lines will have to analyse the basis of conflict amongst different stakeholder groups. Figure 1 depicts the possible bases of conflict among demand-side and supply-side stakeholders. Along the intermediation dimension supply-side stakeholders would want to increase (or keep same) the scope and power of the officials whereas demand-side stakeholders would want to reduce this influence. In both the Bhoomi and CARD systems, the role of supply-side stakeholders was maintained or increased, and there was subsequent pressure from citizens and the media to reduce this. Further research is required to establish whether the question of the level of dis-(or re-) intermediation can be framed at the design phase itself.

So far, supply-side stakeholders have always kept out demand-side groups from the design of system features and implementation of the system; the latter are included only after deployment. Research has to examine the scope and mode of demand-side inclusion in the design process. With the increasing awareness of technology and an informed citizenry, in developing countries, the exclusion of citizens in the design process could lead to debilitating conflict.

A third dimension that requires further study and that provides scope for conflict is the control over and access to data that invariably increases for supply-side stakeholders. With manual systems, the data records are physically stored closer to citizens or to the source of the data, but with e-government systems the data location is typically in centralised, remote servers. This leaves citizens in a position where they have to re-learn and re-negotiate the processes by which they could access their data. Conflict arises as there is a potential for misuse (or perceived misuse) of the data by supply-side stakeholders.

With implementation of large and complex e-government systems, the potential for conflict assumes significance and it plays out subtly through policies, media reports of particular aspects of problems with systems, project reports, case studies and public speeches by officials. That it exists is incontrovertible and yet it remains largely unexplored in the literature.

## CONCLUSION

This article espoused a nuanced reading of stakeholders in the context of e-government systems in developing countries. Demand-side and supply-side stakeholders are two broad categories of interested parties that impact the final implementation of e-government systems, however this distinction is rarely included in the theory or assessment of such systems. Supply-side groups play the dominant role in the implementation process as they define the entire life cycle of the project, whereas demand-side groups are included only marginally. With such an exclusion of demand-side groups, the main impact is on the (dis-) intermediation of officials in the system; where these officials could have been displaced in the new system, their roles and positions are usually maintained. Such differences in views leads to conflict along several dimensions and this remains as future work for this research.

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## KEY TERMS

**Conflict:** Oppositional positions by two parties, such as stakeholder groups, arising from their views of what an e-government system should be.

**Demand-Side Stakeholder:** A person or agency who is desirous of the services offered by any e-government system and who will have an impact on it in a practical sense.

**E-Government:** Government's use of information technology to introduce efficiency and transparency in its own functioning and in its service offerings to citizens.

**Ensemble:** A view of information systems that includes the technology as well as the people and institutions that use the technology, and interactions between them.

**Implementation:** Analysis, design, and installation of a system on hardware and software.

**Intermediation:** The act of coming in between or intervention by electronic means; where e-government systems connect citizens to governments without intervening officials.

**Supply-Side Stakeholder:** A person or agency that is responsible for offering e-government services and who will have an impact on its design and functioning in a practical sense.

# Implementing E-Government Systems in Transition Economies

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## INTRODUCTION

In the last 20 years, the explosive development of telecommunication and computer technology has transformed information in the most important economic and social asset. The information society has changed the rules of interactions between people and organisations, increasing the power of individuals. The specific characteristics of the Internet permit freedom of expression and interaction, to a level unmatched by the traditional channel of communications.

As the use of the Internet became more spread in the society, the governments understood that it is risky and ineffective to ignore the possibilities provided by online information and communication. Since the Internet cannot be controlled by any single institution, the only possibility to influence public opinion is to participate in online exchanges. From this perspective, the Internet can be defined as a highly democratic media channel, which allows not only one-to-one, one-to-many or many-to-many communication, but also the storage and retrieval of historical data.

On the other hand, Internet communication can improve the efficiency of various administrative operations and reduce costs. E-government tends to be multidimensional, impacting above all on economic, social and governance dimensions. The benefits of introducing online system in the area of government and public administration are many and varied, such as: cost-effective delivery of services, improved revenue collection on taxes and service levies; IT literacy and reduction of the internal digital divide; increased access to and quality of education; improved education management capacity; improved social security; improved social welfare; integration and coordination of social and economic policy; improved public safety and security; increased capacity for a rational distribution of public funds (geographically and among population groups); greater accountability and transparency in public administration; better coordination and cooperation among government agencies and among different levels of government; improved public relations and communications; increased awareness of rights of civil society and obligations of government; greater public participation in governments' affairs (United Nations, 2003).

The implementation and effective co-ordination of e-government systems is complex and difficult, requiring knowledge and substantial resources. The implementation process will be most probably influenced by the level of economic development of every country, as well as by the political agenda of the ruling party. From this perspective, there might be significant differences between the developed economies that have a stable democratic system, and the developing countries, or the economies in transition.

These countries, some of them with a fairly developed financial and technological infrastructure, experience specific conditions in terms of knowledge, technological abilities, IT market, telecommunication infrastructure, and regulations. Many of these countries are presently attempting to transform a traditional economy, into an e-society in which Internet communication and interaction pays a central role.

## BACKGROUND

As in the case of e-commerce models, the implementation of advanced e-government systems is a gradual process. A report prepared by the United Nations (2003) has defined the five gradual stages of e-government implementation: (a) emerging e-government—characterised by the establishment of an online presence—often an government Web site; (b) enhanced e-government, in which the functions of the e-government platform become more diversified and the information exchange between government and citizens becomes more dynamic; (c) interactive e-government, when the government online portal permits downloading of administrative forms and documents, sending e-mail messages to officials, or engaging in online discussion forums; (d) the transactional stage, when the Internet connection offers facilities to pay taxes or conduct public administration online transactions; and finally (e) seamless e-government, which is characterised by a full integration of e-services across administrative boundaries.

A country's social, political, and economic background correlates closely with its e-government program development (United Nations, 2003). However, some developing and transitioning economies succeeded to implement, in a short period of time, very advanced e-government systems. Key factors such as the state of telecommunication infrastructure, the strength of the human

capital, the political will, and commitment of the national leadership, play important roles. Each of these factors influence how decision makers, policy planners, and public sector managers elect to approach, develop, and implement e-government programs.

According to a 31-country survey of nearly 29,000 people by market research firm Taylor Nelson Sofres, 30% of the adult population around the world now accesses some aspect of government on the Internet (eGovernment, 2003a). However, the service adoption curve has displayed little variation; information searches and form downloads show fairly widespread and growing (though moderately) usage, while the percentage of users providing personal information to their governments over the Internet and those paying for government services online remains low and static.

These findings can hardly qualify the e-government systems as service oriented and citizen-centric, since they are not a medium to elicit useful feedback and an active participation of the population to the political decision making. E-government should increase citizens' involvement in the process of governance at all levels, by introducing new voices in the current political dialogue, and enhancing the system of e-democracy.

Despite the recognised importance of e-government in transition economies and developing countries, as an engine for economic and political change, encouraging sustained growth and interactive democracy, very few studies have concentrated on the pattern of e-government implementation and development in these countries. Most of the material available are reports and surveys initiated, and prepared by transnational institutions, such as the United Nations, European Commission, or by market research organisations—eMarketer or Taylor Nelson Sofres.

The transition economies from Central and Eastern Europe need to make a special effort in order to develop the information and telecommunication infrastructure, and to avoid the formation of an e-elite that controls information access and use in these countries. At present the importance of an information-based society is recognised by all the government in the region, and important initiatives have been taken to at political, legal, and social level.

## ELEMENTS DETERMINING AND INFLUENCING SUCCESSFUL DEVELOPMENT OF E-GOVERNMENT SYSTEMS IN ROMANIA

The following elements are essential for the introduction and development of effective e-government systems in transition economies (O'Brien, 2004):

- **Government:** Political orientation, priorities and will
- **Citizens:** Access to Internet, skills for interacting with a Web site, knowledge of e-government initiatives
- **Internet Penetration and Telecommunication Infrastructure**
- **Systems' Compatibility:** Supporting legislation, electronic payments, democratic ideology

Each of these four elements will be discussed in detailed in the following pages, presenting the existing situation in Romania.

### Government Initiatives

The implementation of an integrated e-government system is considered essential by the Romanian government, considering not only the needs of the population, but also the perspective of becoming a member of the European Union (Filip & Stoica, 2002; O'Brien, 2004). Romania began its e-government effort in late 2000, declaring its intention to move fully into the information age (Patterson, 2002).

The Romanian government established a series of strategic objectives for the implementation of efficient e-government services (Malacopol, 2002):

- To create the legal framework (predictable, simple, consistent)
- To facilitate the industry development (favourable, stable and highly predictable environment for business growth, ensuring fair competition, granting specific facilities and incentives)
- To promote the electronic services awareness, security and consumer confidence
- To generate national sustainable economic growth and foreign direct investment through the communications and information technology sectors
- To build up synergic co-operation for different industries using global communications systems
- To set up an example of development and a growth engine by the government involvement in building successful projects.

In September 2003, the Romanian government launched its e-government portal—www.e-guvernare.ro—providing a one-stop shop to public services online (eGovernment, 2003b). The portal, also called "Electronic National System," gives 24/7 access to information from central and local government institutions, official forms and interactive services. 164 official forms from 465 public institutions, and five interactive services are currently

available, such as VAT declaration and submission of statistical information (eEurope+, 2004). Additional initiatives were taken at governmental level for the development of e-procurement in public administration (Kablenet, 2002), and e-voting.

The Romanian government's e-procurement platform went live on March 4, 2002 and is now available to 947 public bodies and 7,800 suppliers (eGovernment, 2003c). The Romanian Ministry of Communications and Information Technology announced in May 2003 that the number of transactions conducted through the government's e-procurement platform had reached 100,000. More than 60,000 of these transactions were conducted since the beginning of 2003, signalling a growing take-up of the platform by public entities.

The Romanian government approved on October 2003 an urgent ordinance, allowing a test of e-voting methods during the referendum on constitutional changes held on October 19 (eGovernment, 2003d). The Ministry for Communications and Information Technology announced that members of the Romanian military and police currently in mission abroad (Iraq, Afghanistan, Bosnia-Herzegovina, and Kosovo) will be able to cast their votes electronically during the referendum. These votes have been submitted using digital certificates and registered through an electronic voting system managed by the Romanian Central Electoral Bureau.

## Citizens and Enterprises: Human Skills and Development

It is estimated that in Romania there are more than 4 million Internet users (ITU, 2004). From these, 34% have Internet access in their professional office, 25% access the Internet in schools or Internet Cafes, and the remaining 24% are home users (Paunescu, 2003). Most of the intensive Internet users (at least 2 hours every day) are young, having ages between 18 and 25 years old (36%), or between 26 and 36 years old (38%).

Unfortunately, a large proportion of the Romanian population does not have the necessary knowledge and skills to use a computer or to access the Internet. The study eEurope+(2004) outlines that in terms of skills, 21% of the interviewed people claimed that they do not know what Internet is, and 45% that they do not know how to use a computer. In terms of technical reasons for not using the Internet, 7% of the people answered that they do not have a computer at work, 7% that the Internet is too complicated, and 13% that they do not have an Internet access device at home.

Although the number and the profile of the Internet users is important for the design and implementation of specific e-government services (e.g., the large proportion of young Internet users indicate the need for a more flexible, interesting layout of the governmental Web sites), it is also important to assess the intensity of use of the existing e-government services, both for individual citizens and for enterprises.

The study conducted under the Program eEurope+ (2004) provided an insight into the intensity of use of e-government services in Romania, considering both individual citizens and enterprises. Only 2% of the interviewed citizens have downloaded official forms from the e-government site, and 3% have sent filled in forms using the online facility—these percentages represent the lowest among all the other countries from Central and Eastern Europe. The situation is similar for the interaction firms-e-government site: 3% of the interviewed firms used the "social contribution for employees" online service, 1% the "notification of VAT," 3% the "declaration of corporate tax," and 4% the "declaration of VAT."

These figures show that the human capital in Romania is still in a developing stage, and that much must be done to improve the Internet and computer skills, as well as the use of the existent e-government services by the population.

## Internet and Telecommunication Infrastructure

The development and the reliability of the Internet and telecommunication infrastructure are essential for the effective implementation and development of e-government systems. If the citizens do not have access to reliable and cheap Internet connections, the e-government system will be no more than political propaganda.

The statistical data presented in Tables 1, 2, and 3 show that although Romania has made continuous progresses in developing the Internet and telecommunication infrastructure, it is still far away from the European level of the same indicators.

If the e-government system wants to fulfil the ambitious function of implementing e-democracy and increasing public participation in political debates and processes, the level of infrastructure requires substantial development. This can be done simply by providing

*Table 1. Internet indicators—Romania 2000/2001/2002/2003 (ITU, 2004)*

| Internet Indicators | Internet Hosts (total) | Internet Hosts/10,000 inhabitants | Internet Users (000) | Internet Users/10,000 inhabitants |
|---|---|---|---|---|
| Romania 2000 | 41,523 | 18.51 | 800 | 356.67 |
| Romania 2001 | 46,283 | 20.67 | 1,000 | 446.63 |
| Romania 2002 | 40,971 | 18.90 | 2,200 | 1,014.71 |
| Romania 2003 | 47,428 | 22.59 | 4,000 | 1,905.27 |
| Europe 2003 | | 280.95 | | 2,388.30 |

*Table 2. PCs indicators—Romania 2000/2001/2002 (ITU, 2004)*

| PCs Indicators | Estimated PCs (000) (total) | Estimated PCs / 100 inhabitants |
|---|---|---|
| Romania 2000 | 713 | 3.18 |
| Romania 2001 | 800 | 3.57 |
| Romania 2002 | 1.800 | 8.30 |
| Europe 2002 | | 21.44 |

*Table 3. Telecommunication indicators—Romania 2000/2001/2002/2003 (ITU, 2004)*

| Telecommunication Indicators | Main telephone lines (000) | Main telephone lines / 100 inhabitants |
|---|---|---|
| Romania 2000 | 3,899.2 | 17.38 |
| Romania 2001 | 4,116 | 18.38 |
| Romania 2002 | 4,215.2 | 19.44 |
| Romania 2003 | 4,300 | 20.48 |
| Europe 2003 | | 41.00 |

the required supporting legislation, and creating the necessary market conditions for free competition. There are clear signs that the government has initiated measures for updating the legislation and increasing the competition in IT&C markets (Filip & Stoica, 2002).

## Systems' Compatibility

The success of e-government initiatives is also influenced by the compatibility of online systems with other social, economic, or financial systems functioning in the country. A good example is the system of electronic payment, which is absolutely essential to permit efficient online transactions on the government Web site. This system requires an appropriate legislative framework, and an "electronic currency" economy.

The Romanian market is still mainly based on a "cash culture," the credit or debit cards being virtually unknown 10 years ago. The successful introduction of digital banking channels therefore requires a gradual development of the market for electronic financial services. A recent study (eEurope+, 2004) has shown that only 2% of the people and 12% of the businesses included in the sample are using the Internet for banking or other financial services in Romania.

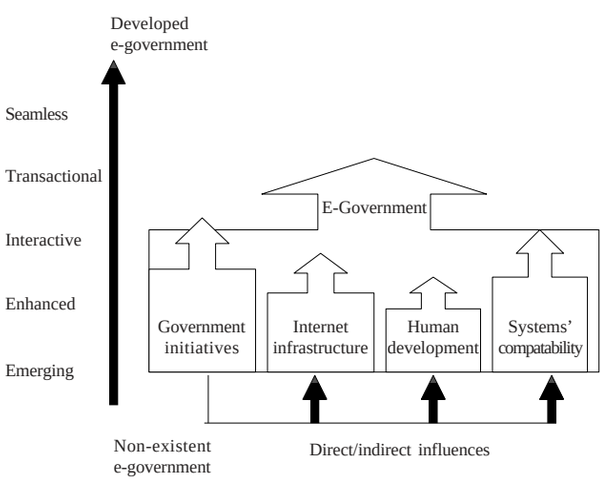
Recent governmental regulations regarding the payment of salaries by state enterprises directly in card accounts (since August 2003), and the introduction of electronic payment for all public services (since July 2003), will most probably encourage the extensive use of banks cards in the Romanian economy.

## FUTURE TRENDS

Despite the clear progresses achieved by Romania in the implementation of e-government systems, there is still much to be done. All the four major elements identified as essential for the effective functioning of e-government services should be developed and enhanced: government initiative, human capital development, improvement of Internet and telecommunications infrastructure, and the increased compatibility of various social, economic, and financial systems with the e-government services (see Figure 1). On the other hand, the institution responsible with the implementation of e-government projects should monitor the performance of these sites, and take concrete action for improving them. Analysing the present situation, it can be considered that the development of e-government systems in Romania is in the "interactive" stage, although elements of the "transactional" stage can also be identified (United Nations, 2003).

The Romanian government has already initiated a series of project for the future development of the e-government platform. One of the greatest challenges is the lack of Internet connectivity experienced by rural communities. In order to solve this problem, the Romanian Ministry of Communication and Information Technology and the World Bank have launched in January 2004 the "Knowledge-based Economy" project which will install 300 local virtual networks or telecenters in rural communities (Zamfirescu, Filip, & Brbat, 2005). These local telecenters will improve not only the link between citizens

*Figure 1. The situation of the four elements required for the effective implementation of e-government services in Romania*



and the government, but will also provide a better access to information and education (World Bank, 2004).

The USAID-funded Romanian Information Technology Initiative Project, in partnership with the Romanian Ministry of Communications and Information Technology, have organised in September 2005 an e-government forum on building local projects through public private partnerships. The participants to this forum have identified a series of priorities for the future development of e-government applications in Romania. Their conclusions outline that the government initiative should be multi-directional: firstly, it should train and motivate public servants to use information technology; secondly, the general policy framework and infrastructure for digital communications must be designed to support innovation, expand access, and generate trust in online systems; and thirdly, the e-government strategy must be connected to local communities and to the local administration. The next phase of e-government implementation should focus on interoperability, in order to open the wireless access to e-government applications to mobile phone users, at an European level (ITDC, 2005).

## CONCLUSION

In comparison with other countries from Central and Eastern Europe, the implementation of e-government systems in Romania has followed a particular model (O'Brien, 2004). Although the infrastructure, the human capital, and the compatibility with other systems was insufficiently developed, the government has taken important steps for the implementation of e-government services: the launch of the official Web site of the government with a directory containing administrative forms and information, and especially, the introduction of an online platform for e-procurement, which was supported by a clear legislation initiative.

One of the most important factors identified as crucial by the United Nations (2003) report, political will and initiative, is undoubtedly present in Romania. Unfortunately, the access to e-government services is drastically limited by the poor Internet infrastructure, the low Internet penetration, and the level of Internet/computer skills of the population. On the other hand, the existent e-government services are not effectively promoted by central and local administrative services, which creates an additional barrier to an intensive use of the e-government system (Popescu, 2002).

All these problems can be addressed, directly or indirectly, by the Romanian government, in order to harmonise the level of development of all the four elements that are necessary for the effective use of e-government services.

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## KEY TERMS

**Citizen-Centric Systems:** E-government systems that are designed to enhance citizens' participation in the political and social environment, taking into accounts their profile, behaviour and needs.

**E-Democracy:** The use of information and communication technologies and strategies by democratic actors (governments, elected officials, the media, political organizations, citizen/voters) within political and governance processes of local communities, nations and on the international stage.

**E-Elite:** Social or political class that have preferential access to information technology, being able to control the information flows in a society.

**E-Government:** The use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) in order to transform their relations with citizens, businesses or other government agencies, and to increase the efficiency of their operations.

**E-Payments:** The use of information technology applications and devices to make payments in electronic format.

**E-Procurement:** The business-to-business or business-to-government purchase and sale of supplies and services over the Internet. The organisations implementing e-Procurement systems expect to be able to control inventory more effectively and reduce purchasing agent overhead.

**E-Voting:** An election system that allows a person to vote electronically, using online information technology applications.

# Implementing Enterprise Systems in the Public Sector

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## INTRODUCTION

*Modernizing public administration requires a new approach to technology. You can no longer rely on rigid, monolithic service systems. You need technology that can increase efficiency, improve economic viability, enhance process transparency, and help you communicate with the public. You need a public sector solution that supports integrated processes, simplifies service-oriented administration and cost management, and distributes the information needed for judicious planning and decision making.* (SAP, 2003)

## BACKGROUND

Enterprise systems (ES), also known as enterprise resource planning (ERP) systems, appear to be a dream come true as they promise seamless integration of all the information flowing through an organization: financial and accounting information, human resource information, supply chain information, customer information, and so forth (Davenport, 1998). The market for ES has grown enormously during the nineties. Most of the Fortune 500 companies have already installed ES (Kumar & Van Hillegersberg, 2000). For government the promise of ES might even be larger as integrated information flows can support government's processes in numerous ways and help improve service delivery, accountability, and managing for results. As the implementation of ES has proven to be quite difficult due to far-reaching consequences for the organization as a whole, the growing number of government organizations choosing to implement an ES needs to learn from previous experiences. Unfortunately, the scientific literature on ES implementation is mostly limited to the private sector, and as such neglects a substantial part of the organized society. Furthermore, implementation is even more difficult due to the unique nature of government organizations.

The structure of the article is as follows. First, a description of ES is given, as well as the problems that generally surface during the implementation process. Then, public sector issues with information systems implementation are derived from literature on IT in the public sector. Subsequently, the scarce literature in the field of public sector ES implementation is synthesized and discussed. Based on the aforementioned two streams of research and the few studies already conducted, the emerging trends and research opportunities in the field of public sector ES implementation are put forward. Finally, the key findings are summarized in the conclusion.

## ENTERPRISE SYSTEMS AND IMPLEMENTATION ISSUES

What differentiates ES from other types of large information systems? ES are characterized by four main traits. First and foremost, ES integrate the information flows within the organization. Furthermore, ES are commercial packages (i.e., vendors release them). Third, ES consist out of best practices. And final, since every organization is in essence unique, some assembly will always be required; ES integrate the software, not the computing platform.

Due to the sheer size and reach of ES packages, complications during implementation quickly arise. Most notorious is the impact on the organization as a whole. Davenport (1998) points out that ES have profound business implications, and offloading responsibility to technologists is particularly dangerous as technical challenges are not the main reason ES fail. Companies often fail to reconcile the technological imperatives of the ES with the business needs of the enterprise itself. Also, the business often must be modified to fit the system (Davenport, 1998). This means the organizations' business processes need to be reengineered to fit the best practices that comprise the system, which considerably adds to the expense and risk of introducing ES (Kumar & Van Hillegersberg, 2000; Markus & Tanis, 2000). Moreover, vendors try to structure the systems to reflect best practices, but it is the vendor, not the costumer that is defining what "best" means (Davenport, 1998). This means the adopting organization is dependent on the vendor for updates of the package (Markus & Tanis, 2000). Furthermore, achieving full integration depends a lot on the

configuration of the system and the choice for installing just one system instead of modules from multiple vendors (Markus & Tanis, 2000). Still, in addition to having important strategic implications, ES also have a direct and paradoxal impact on a company's organization and culture. On one hand organizations are capable to streamline their management structures, creating flatter, more flexible, and more democratic organizations. On the other hand, they also involve the centralization of control over information and the standardization of processes, which are qualities more content with hierarchical, command-and-control organizations with uniform cultures (Davenport, 1998).

Next to these organizational impacts of ES, organizations also have good reasons not to adopt ES or even abandon ES implementation. Two reasons that are often mentioned is that the packages in the market lack fit with the specific needs of an organization, and that ES have the tendency to inhibit flexibility, growth, and decentralized decision making. Also important are the available alternatives, for instance sophisticated data warehousing or using middleware to change a system's architecture (Markus & Tanis, 2000). To sum up, the main reasons for not adopting a system also hold for ES: high cost, no competitive advantage, and resistance to change.

## INFORMATION SYSTEMS IMPLEMENTATION IN THE PUBLIC SECTOR

Next to the specific characteristics of ES implementation, information systems implementation in the public sector differs from information systems implementation in business. Numerous studies have been conducted to define the differences between the public and private sector, however, still one of the most influential in the field of information systems is the article by Rainey, Backoff, and Levine (1976). They distinguish three main characteristics in which public sector organizations differ from private sector organizations. Usually, public sector organizations are less exposed to the market, resulting in: less incentive for effectiveness, more legal and formal constraints, and higher political influences. Also, due to the unique sanctions and coercive power of government, demands on fair, honest, responsive, accountable, and honest behaviors by public managers are higher. And, public managers need to handle complex—possibly conflicting—criteria, while there is high turnover of politically appointed top managers.

Based on these distinctions Caudle, Gore, & Newcomer (1991) made a study on key information systems management issues for the public sector. Unique and paramount for the public sector is the linking of IS planning and budgeting as a replacement for the allocative mechanism of the market, and freely transferring a technology from one agency to another contrast sharply with private sector IS development. Issues that already have peaked in the private sector but are still on the rise in the public sector are the integration of technologies, end-user computing, and office automation. This lag is most probably caused by limitations by government red tape and accountability requirements (Caudle, Gorr, & Newcomer, 1991). The authors end with some theoretically derived potential issues. Public managers should be more inclined to develop new information technologies than their politically appointed superiors. And, the more red tape the organization has, the more flexible the information technology employed should be.

Even a decade later, Brown (2001) worries about the elementary level of issues mentioned in a UK government report on the delivery of government IT projects. The list of issues that need more attention in the UK public sector—but most probably in all Western governments–includes: commitment of senior management; identifying the end users and their needs; skilled and knowledgeable project managers; breaking down a project into manageable sub-components; adequate training; importance of IT contract definition, negotiation and management; contingency plans in place; and a post-implementation review (Brown, 2001). All these lessons can be found in basic handbooks on IT implementation. Another important lesson rings a bell: key decisions about IT systems are business decisions not technical ones (Brown, 2001; cf., Davenport, 1998).

## PUBLIC SECTOR ENTERPRISE SYSTEMS IMPLEMENTATION

Very few studies have been conducted on ES implementation in the government. After a search for combinations of the words "government" or "public sector," with "enterprise system," "enterprise systems"or"enterprise resource planning" in the "Web of Science" and "Business Source Elite" databases a number of scientific articles appeared. A further selection was made by reading these articles and removing those that included studies in which ES implementation in the government was not the main topic of the study (Ashbaugh & Miranda, 2002; Bannister, 2001; Boudreau & Robey, 2005; Yen & Sheu, 2004), and those that where conducted in a university setting (Scott & Wagner, 2003; Siau & Messersmith, 2003). We removed studies on academic administrations from our selection, as universities are not very representative for government organizations such as ministries,

municipalities, executive agencies, etc. Finally, four articles remained (Chang & Gable, 2002; Gulledge & Sommer, 2003, 2004; Kumar, Maheshwari, & Kumar, 2002). Most noticeable, besides the few studies conducted in total, is that all articles have been published after 2000. It appears that the study of public sector ES implementation is still in its infancy.

The two articles by Gulledge and Sommer (2003, 2004) report on an U.S. Department of Defense installation management enterprise implementation, and two U.S. NAVY implementations. The 2003 article differs from the other articles in the sample as the authors argue that there is nothing special about public sector business processes that insulate them from modern private sector management methods. However, in their more recent article they stress that in the private sector the implementing organization usually owns all of the business processes within its domain, while in the public sector this is not always the case. This can lead to a "split instance": multiple standard software solutions are implemented in a domain that requires a single instance. Gulledge and Sommer argue that this problem is political and driven by the desire of senior management to preserve organizational stovepipes. Bannister (2001) also emphasizes the importance of breaking down specialized vertical system to provide an integrated service to the citizen. Currently, for instance Gortmaker and Janssen (2004) are studying opportunities for business process orchestration in the public sector.

The other two articles (Chang & Gable, 2002; Kumar, Maheshwari, & Kumar, 2002) take a more factor oriented approach as they provide us with vast lists of (sub-) issues. Both studies used surveys to gather their data. Chang and Gable studied five Australian government agencies, while Kumar et al. focused on 10 Canadian government organizations. Chang and Gable choose to use a modified Delphi technique to derive major and sub issues and have respondents weigh the major issues. Unexpectedly, they found very scarce influence of organizational context, including politics. Next to problems with reporting functionality and security, mainly human aspects were problematic. Examples were that few people understood the system beyond a single module, inadequate training, and a lack of understanding between agency staff and implementation personnel.

Kumar et al. based their survey on three of the four phases in the ERP Experience Cycle of Markus and Tanis (2000). The onwards and upwards phase was not studied as none of the organizations in their sample had reached this stage (!). Kumar et al. provide the percentage of respondents that said they had encountered these specific issues. From their research, above all, cost escalation arises as a major issue, whereas human aspects, primarily in the form of training play an important role too. Also, modifying the software and developing add-ons countered a number of ERP limitations. Surprisingly, they found that very few organizations reported changes in organizational structures to support the new systems.

## FUTURE TRENDS

It is important to consider that ES are still evolving in functionality, service arrangements, terminology, and—perhaps most interesting—architecture (Markus & Tanis, 2000). Two future developments in the architecture domain stand out most. One is the evolution of extended ES towards including interorganizational processes such as supplier and customer relation management (Kumar & Van Hillegersberg, 2000). The other is a component-based strategy that would rely on a minimal ERP backbone together with a variety of domain-specific components (see Sprott, 2000). The organization is then responsible for the selection, design or development of their components. In this manner ES will become much more flexible than they are nowadays. Other future developments are the move from transaction data to other types of documents (e.g., multimedia documents, and the move from transaction processing to decision support, data mining, and executive information systems) (Kumar & Van Hillegersberg, 2000).

Additionally, a recent global study among different sectors found that the organizations that already adopted ES, have still fully obtained the promised benefits (Davenport, Harris, & Cantrell, 2002, 2004). The researchers emphasize the need to further integrate, optimize, and informate. Better integration can be achieved by unifying and harmonizing ES, data, and processes with the environment, and better connecting units and processes, as well as with customers and suppliers. Better optimization is reached by standardizing processes to fit best practices, and to fit processes with strategy and systems. And, organizations need to informate: using information to transform work, to support business analysis, and for decision-making needs. An example of an opportunity for government improvement found in this study, was that government organizations were ranked second-highest with management reporting and metrics functionality installed, but failed to utilize this information as they also have the lowest number of performance management functionality installed compared to the business sectors.

A lot of opportunities for public sector ES implementation research exist as the field is still in its infancy. The underlying dynamics of resistance to ES implementation need to be mapped to get past lists of major issues as present in two of the four articles. In the first place, studies in the public sector will add to the general ES implementation literature by contextualizing the findings of previous studies. Will these findings hold in a public

sector environment? Furthermore, there needs to be research into differences between specific governmental sectors. Additionally, the public sector can be fruitful ground for studies into professional or service-oriented organizations. Of course, the important venues Markus and Tanis (2000) mentioned, can just as well be studied in the public sector: financial costs and risks; technical issues; managerial issues; IT adoption, use and impacts; and integration. The Enterprise System phenomenon has strong conceptual links with just about every major area of information systems research. Yet, most rewarding might be the exemplary role government can play in pursuing a components-based strategy, due to the ease of technology transfer. Perhaps, components for government ES can be developed around the globe as open source software (see, Von Hippel & Von Krogh, 2003).

## CONCLUSION

A number of issues can be perceived as well in ES implementation as in public sector information systems implementation. Obviously, the implementation of any system must be seen in a broader perspective then solely technical. In addition, the integration of public sector IT is lagging compared to business. This might also explain the currently limited number of studies on ES implementation in the public sector. From the studies conducted specifically into ES implementation in the public sector we learn a number of things. Foremost, the problems encountered by government are quite similar to those encountered by business. However, a number of typical issues did arise in these studies. The integration of different information flows provided by ES might be terse due to the public sectors' organizational stovepipes. Also, the ES software needed to be modified in half the organizations, which meant that higher investments needed to be made and implementation became more complicated. Furthermore, very few organizations reported changes in organizational structure to support the ES, also the availability and retention of skilled staff was problematic, both possibly inhibited by red tape (see Bozeman, Reed, & Scott, 1992) or other public sector constraints. It is therefore important for public sector organizations to negotiate increased attention on government specific needs for ES (Kumar, Maheshwari, & Kumar, 2002).

Interesting is the statement that there is a theoretical relationship between the amount of red tape and the flexibility of the information technology used (Caudle, Gorr, & Newcomer, 1991). This would either mean that reengineering with ES could abolish vast quantities of red tape, or that public sector ES need to be flexible to adapt to rule-bound public sector organizations. Either viewpoint currently sounds quite utopian. Yet, the most promising future venue might be a component-based strategy, as government is usually more rule-bound and technology sharing should be easier than in business. In this way government can leave its lagging position and leap jump to become a frontrunner in the ES field.

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## KEY TERMS

**Component-Based Strategy:** Strategy based on agreed standard interfaces that allow the disparate sets of parts to be assembled, to interoperate and to be upgraded with newer parts that conform to the same interface.

**Enterprise System (ES):** Configurable information system package sold by a vendor, which integrates information and information-based processes within and across functional areas in an organization based on best practices.

**ES Best Practices:** The standard templates for generic business processes instilled in an ES. These best practices may differ quite substantially from the way any particular organization does business and implicitly demand a certain level of process reengineering to reach cross-functional efficiency and effectiveness.

**ES Implementation:** The entire adoption process of an ES system: starting with the idea of introducing an ES, running the introduction project, stabilizing the system, and onward; maintaining the system, supporting the users, getting results, and upgrading.

**ES Functionality:** A business function supported by a software module in an ES. Examples of functions are finance and accounting, human resource, supply chain, customer information, and many more.

**ES Module:** A packaged functional assembly of software for use with other such assemblies within an ES. See ES functionality.

**ES Package:** A package purchased or leased from ES software vendors (like SAP, Peoplesoft, Oracle, Baan, JD Edwards, etc.) instead of being developed in-house from scratch. This means implementers of an ES often need to adjust the organization's ways of working to fit the package, they enter into long-term relationships with software vendors, and they depend on the vendor for continued enhancement of their package.

# Implications of FLOSS for Public Organizations

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## INTRODUCTION

In the last years, free and open source software (also sometimes termed libre software) has gathered increasing interest, both from the business and academic worlds. As some projects in different application domains like most notably the operating system Linux together with the suite of GNU utilities, the office suites GNOME and KDE, Apache, sendmail, bind, and several programming languages have achieved huge success in their respective markets, both the adoption by commercial companies, and also the development of new business models by corporations both small and large like Netscape or IBM have increased. Given this situation, it did not take a long time for the discussion surrounding this new phenomenon to reach public organizations. Especially the most prominent example, the choice between a free operating system like GNU/Linux or a commercial system like Microsoft Windows has sparked interest in this new form of software, its legal and economic implications, and its new model of software development.

In this article, these implications will be explored, explicitly not focusing solely on the Linux vs. Microsoft debate. To this end, an introduction to free/libre/open source software (FLOSS) and its concepts will be given, then different aspects of the relationship between FLOSS and public organizations, especially e-government, together with future trends will be discussed.

## BACKGROUND

### History of FLOSS

The history of FLOSS (Gonzalez-Barahona, de las Heras Quiros, & Bollinger, 1999; Raymond, 1999; Working Group on Libre Software, 2000) in fact started very early, as in the 1950s and 1960s the first large-scale computers from IBM and others came with software that was distributed with source code, could be modified, improved, and shared.

The history of the current free and open source movement is closely interconnected with the history of the Unix operating system, which after having been largely free, was commercialized following the AT&T divestiture in 1984. This led to the foundation of the Free Software Foundation and the GNU Project by Richard Stallman in 1983 (Stallman, 2002). The aim was to produce a free Unix-like operating system, but for the time being, mostly tools and compilers were produced. Besides this, Unix was also improved at the University of California at Berkeley, mainly funded by DARPA contracts, spawning both Sun Microsystems and the later BSD (Berkeley Software Distribution) family of free operating systems.

Another milestone in the FLOSS movement was the announcement by Finnish graduate student Linus Torvalds that he has been working on a Unix-like kernel for x386-microprocessors (Torvalds & Diamond, 2001), whose source he released and which was to be known as Linux. After this, the movement became known to a wider public, leading to other memorable events like Netscape releasing the source code of the Navigator browser in 1998 (Hamerly, Paquin, & Walton, 1999) thus founding the Mozilla project, the continuing support by corporations like IBM and the rise of new firms like RedHat or VALinux.

### Definition of FLOSS and Licenses

The area of FLOSS is surrounded by several terms, most notably open source software and free software (Dixon, 2003; Laurent, 2004; Rosen, 2004). The term open source as used by the Open Source Initiative (OSI) is defined using the open source definition (Perens, 1999), which lists a number of rights which a license has to grant in order to constitute an open source license. These include most notably free redistribution, inclusion of source code, to allow for derived works which can be redistributed under the same license, integrity of author's source code, absence of discrimination against persons, groups or fields of endeavor, and some clauses for the license itself, its distribution, and that it must neither be specific to a product nor contaminate other software.

The Free Software Foundation (FSF) advocates the term free software, explicitly alluding to "free" as in "free speech", not as in "free beer" (Stallman, 2002). A software is defined as free if the user has the freedom to run the program, for any purpose, to study how the program works, and adapt it to his needs, to redistribute copies and to improve the program, and release these improvements to the public. Access to the source code is a necessary precondition. In this definition, open source and free

software are largely interchangeable. Libre Software is the European term for free software and is used as a way of referring both to free and open source software. The GNU project itself prefers copylefted software, which is free software whose distribution terms do not let redistributors add any additional restrictions when they redistribute or modify the software. This means that every copy of the software, even if it has been modified, must be free software. This is a more stringent proposition than found in the Open Source Definition, which just allows this.

The most well-known and important free and open source license, the GNU General Public License (GPL), is an example for such a copyleft license, with the associated viral characteristics, as any program using or built upon GPLed software must itself be under GPL. To ease these limitations, the GNU project also advocates under special circumstances the use of the GNU Lesser (formerly Library) General Public License (GNU LGPL), which permits linking with non-free modules. There are a number of other licenses, some of which can be considered copyleft, like the X11 license or clarified versions of the original, vague Artistic License, and others which can be considered free or open source, like BSD, Apache or the Mozilla Public License and Sun Public License. Other licenses not considered free or open are for example the Sun Community Source License or Microsoft's Shared Source License.

### FLOSS Development Process

Not only is FLOSS unique in its licenses and legal implications, but also in its development process. The main ideas of this development model are described in the seminal work of Raymond (1999), "The Cathedral and the Bazaar," first published in 1997, in which he contrasts the traditional type of software development of a few people planning a cathedral in splendid isolation with the new collaborative bazaar form of open source software development. In this, a large number of developer-turned users come together without monetary compensation (Hertel, Niedner, & Hermann, 2003; Raymond, 1999) to cooperate under a model of rigorous peer-review and take advantage of parallel debugging that leads to innovation and rapid advancement in developing and evolving software products. In order to allow for this to happen and to minimize duplicated work, the source code of the software needs to be accessible which necessitates suitable licenses, and new versions need to be released often.

Possible advantages and disadvantages of this new development model have been hotly debated (Bollinger, Nelson, Self, & Turnbull, 1999; McConnell, 1999; Vixie, 1999). Critics admonish that the largely missing requirements engineering and design, together with the trend to search for bugs late in the life-cycle in the source code lead to high effort, which is just hidden by spreading it throughout the world, but this is countered with arguments of very high modularity, fast release cycles and efficient communication and coordination using the internet. Today, agile methods like eXtreme programming or the strict release processes in place in several open source projects (Holck & Jorgensen, 2004) give evidence to mixed forms of development. Currently, empirical research on similarities and dissimilarities between FLOSS development and other development models is still proceeding (Koch, 2004; Mockus, Fielding, & Herbsleb, 2002).

## IMPLICATIONS OF FLOSS FOR E-GOVERNMENT AND PUBLIC ORGANIZATIONS

### Overview

In this article, the possible implications of and interactions with FLOSS will be detailed from the viewpoint of public organizations. There are several main areas which are to be distinguished. The first case is a public organization adopting FLOSS, the most prominent example certainly being the choice between GNU/Linux and Microsoft Windows. It is to be analyzed what influences this decision in the general case of any organization, and what special considerations affect this decision for public organizations. In the second area to be considered, public organizations leave the role of passive users and become co-developers. Besides feeding back their own improvements to any project, public organizations might also act as sponsors of FLOSS projects or ideas out of various reasons. In the third and last area to be considered, public organizations interact with FLOSS as regulatory authorities (e.g., regarding software patents).

### Public Organizations as Adopters of FLOSS

The public sector needs to change over to communicating digitally, which is posing great demands on the IT systems on which e-government is based and on work processes in the public sector. This change, especially in the current situation of tight budgets, needs to be made as cost-effectively as possible. As the most obvious characteristic of FLOSS when selecting software is the price, or more correctly the absence of price in the form of license fees, many public organization facing a decision regarding procurement of software consider it. Most prominently this is embodied in the decision between a Microsoft

Windows operating system together with MS Office Suite and competing FLOSS products like GNU/Linux together with GNOME or KDE graphical user interface and OpenOffice.org suite.

But the absence of license fees does not present the whole story, and in addition makes any criticism by proponents of commercial products easy. Any decision in software procurement needs to be based, besides the functionality offered, on the costs over the whole lifetime of the software (Danish Board of Technology, 2002). This viewpoint, as exemplified by the term total cost of ownership (TCO) introduced by Gartner Group, calls for a more thorough analysis of cost factors, not only regarding initial costs of procurement. As there are several proprietary variants of this method available, the different cost categories are not generally defined, but using a generic set of different cost factors throughout the lifetime of a software (Working Group on Libre Software, 2000), possible advantages and disadvantages of FLOSS can be discussed. Naturally, any investment needs to be evaluated carefully on its own. While the pure costs for acquisition are lower due to absence of license fees, prior information gathering might incur higher costs due to decentralization and lower marketing (Golden, 2005). On the other hand, information found will in general be more objective. Regarding implementation of the software, no clear picture can be found, as on the one hand probably less sophisticated installation routines and lower penetration and therefore availability of personnel might hint at higher costs for FLOSS, while on the other hand generally more diverse options for configuration and even changes to the source code might decrease costs. Training might in some special cases benefit from access to the source code as well, but for some FLOSS availability of professional training services poses a problem. Costs for operation and maintenance might be reduced by the possibility for changes to the source code, the availability of a community of co-developers, absence of lock-in to a single supplier and thus increased lifespan, but again lower penetration with scarcity and thus increased price for experienced personnel might be problematic. The transition to a new technology will be eased in the case of FLOSS by availability of the source code and the adherence to open standards, both considerably reducing these switching costs (Shapiro & Varian, 1998). For the most prominent case currently discussed, GNU/Linux vs. MS Windows, a plethora of studies have been made available (Fink, 2003; Rosenberg, 2000), some having been sponsored by public organizations like the cities of Munich (http://www.muenchen.de/linux), Vienna (Gillich, 2004) or Paris, by independent bodies (Danish Board of Technology, 2002), and some inspired by business interests. From a scientific viewpoint, these are difficult to evaluate and compare due to different scenarios applied, and also sometimes secrecy regarding the methods used. The MigrationNavigator (http://www.migrationnavigator.org) tries to help in selecting an appropriate study on migration to GNU/Linux and open source based on an evaluation using a set of criteria including areas covered and focus of analysis.

But cost is not the only factor in IT investment decisions. Indeed, especially FLOSS offers to the user additional freedoms, and these freedoms might indeed have value (Danish Boards of Technology, 2002). For some of these, real options analysis (Taudes, Feurstein, & Mild, 2000; Trigeorgis, 1998) which aims at using option-pricing theory to value flexibilities, might be a possible way of expressing their possible financial return. The first advantage comes from the option to modify and enhance the software at will, in addition to thoroughly checking for any bugs. Some of this work can be relegated to the project's community and thus outsourced, but both direction taken and effort applied are difficult to predict. In general, this will increase the lifespan of a software, as it can be adapted to cope with new platforms or technologies. As a further freedom, the usage of the software is not restricted, so it could be used in other parts of the organization, for other business processes, or even to pursue some business models. Flexibility for the user is also increased or at least preserved due to the fact that there is no single supplier which can possibly terminate support or further development in order to induce switching to a new product.

The main risks currently associated with adopting FLOSS as voiced by organizations are of a legal nature. Naturally, these apply to public organizations as well (Suzor, Fitzgerald, & Bassett, 2004). The first of these is that there is no party who would assume liability, which although probably true when FLOSS is downloaded directly from the project's Web site, need not necessarily be true if a consulting company is involved, and also generally depends on the applicable legislation. Other legal concerns deal with issues of copyright and intellectual property, and are fuelled by SCO's campaign against Linux vendors and users.

Regarding the functionality, a general discussion of FLOSS vs. commercial products surely is not possible, and is even difficult for the case of MS Office and OpenOffice.org. On the other hand, the issue of security which might be, especially in some areas of e-government like e-voting, a primary issue and concern, is often disputed (Payne, 2002; Witten, Landwehr, & Caloyannides, 2001). Proponents of FLOSS argue that open source code allows for parallel review by many people, including in-house auditing, and faster patch releases when problems are found, as there is no dependency on a single vendor to do this, who might be motivated not by purely technical but also commercial considerations. On the other hand, possible attackers

also gain access to the source code and can thus probably more easily uncover loopholes. Currently, data seems to show that indeed FLOSS systems tend to be more secure, but most accounts currently are centered on the operating system field and are not yet conclusive (Payne, 2002; Witten et al., 2001). The fact that FLOSS generally supports open standards is also of high interest in the context of e-government and especially digital communication between the public sector and citizens, as it will allow for universal accessibility of all material produced.

For some public organizations, for example those active in development like the United Nations, the fact that even proprietary software offered for free creates dependencies and does not allow for further sharing, deeper understanding and thus technology transfer, modifications and maybe even pursuing respective business models might increase adoption or at least promotion (Yee, 1999).

Currently we already see some adoption, for example the city of Munich started the "LiMux" project, an evolutionary migration following long discussions also regarding legal risks. In Vienna, a soft migration is planned, in which users have the option of switching to FLOSS, resulting in the IT department charging them less money. Worldwide, for example the Brazilian government started an initiative to migrate 40 percent of its computers to FLOSS by 2006, a similar move being planned in Venezuela. Other countries very active in considering FLOSS adoption are Japan, drawn in by the security aspect, South Korea and China, which has expressed its commitment to building a domestic software industry around Linux, which is also an aim of the Indian government. This is but a small snapshot of current activities, and discussions are still proceeding, as most initiatives have not yet been passed or implemented.

## Public Organizations as Producers of FLOSS

At the heart of the FLOSS development model lies the idea that users abandon their passive stance and join the development team themselves. These contributions could be as small as reporting bugs found, joining discussions on the future directions, or could include fixing bugs or programming additional functionality. Naturally, this could apply to public organizations as well. As the adoption is still limited as described above, this effect is not yet seen to a large degree, but a cooperation having been announced between Munich and Vienna, including for instance for the development of a "public authority desktop" or of an open source groupware, can be seen as a first step. This can also be seen as the start of a new trend: Public organizations pursuing FLOSS business models. While some of the proposed models (Fink, 2003; Golden, 2005; Raymond, 1999; Rosenberg, 2000) are not applicable, cost-sharing, or risk-spreading by opening the code seem to be appropriate.

More than this, public organizations have other means at their disposal as well, especially sponsorship of FLOSS development. For example, Japan has reserved 1bn yen (EUR 80m) for a project that aims to build an inexpensive and trustworthy FLOSS operating system. Another example would be the POSSE project funded by DARPA, an agency which is part of the U.S. DoD, to develop a "trusted" operating system and generally increase security (Smith et al., 2004). The European Community is endorsing FLOSS in the IDA (Interchange of Data between Administrations) programme to co-ordinate the establishment of networks between administrations, and is also sponsoring several related projects in the Sixth Framework Programme for Research and Technology Development, as does the U.S. National Science Foundation.

In fact, one of the roots of the FLOSS idea is that software that has been developed using public funds should not be owned by a private company to gain profits from, but should be preserved as a public good. For example, the software that the X and BSD licenses originally covered was funded by monetary grants of the U.S. government. Since the U.S. citizens had already paid for the software with their taxes, they were granted permission to make use of that software as they pleased (Perens, 1999). Some U.S. states, including Massachusetts, have passed laws prohibiting commercial entities from making money off products developed by the government using taxpayer money. The European Environment Agency (EEA) has for many years made it a requirement that custom built software is supplied as open source.

Criticism voiced towards this point of view centers around the fact that especially software under GPL would also require further extensions to be under the same license, thus stifling innovation based on this research by commercial firms (Hahn, 2002). Naturally, this discussion leads to the more general issues of whether there is a market failure in software industry that warrants intervention, and whether protection of intellectual property is beneficial to innovation or not. These are addressed in the following paragraphs.

## Public Organizations as Regulatory Authorities

In their last role, public organizations face the FLOSS movement as regulatory authorities. Some governments including Germany, France, Spain, and Argentina are currently considering bills pertaining to FLOSS adoption

by public organizations (Hahn, 2002). In Brazil, several municipal governments mandate FLOSS to be given preference. Naturally, these initiatives face criticism as well, for example on the grounds that governments should not intervene in a free market environment but simply pick the best solution for the case at hand (Hahn, 2002). Therefore again, this comes to the question of whether there is a market failure in the software industry. While some authors argue that there is indeed a market failure in packaged software due to incomplete contracts and asymmetric information, and while it is possible that in markets exhibiting network externalities (Shapiro & Varian, 1998) inferior products might come to dominate, the fact itself is very much disputed (Hahn, 2002). In any case, FLOSS might increase competition even in markets with a dominant producer, and might play an important role in enforcing standards by providing reference implementations, thus again reducing possible lock-in of consumers by commercial firms (Shapiro & Varian, 1998; Working Group on Libre Software, 2000).

Even more importantly than this promotion of FLOSS adoption, governmental authorities are today facing decisions which will possibly change the course of this phenomenon and the software industry. The most prominent example is the case of software patents. The economic principle behind a patent is that it provides an incentive by offering a monopoly both to invent and to invest in invention. While copyright is granted on the implementation, the actual program, and is not opposed but in fact used by the FLOSS movement, patents are granted on ideas that could be implemented in software. Possible patent infringements of FLOSS therefore pose a substantial problem and might threaten the whole FLOSS movement (Hahn, 2002; Vemuri & Bertone, 2004). The issue of the patentability of software and its algorithms therefore has been and still is hotly debated, currently in the context of the European Union. After a draft directive was submitted by the European Commission in 2002, the European Parliament approved but only after introducing a number of significant amendments. In 2004, the Council of the EU reached a first political agreement on a compromise, which only includes a minority of these amendments. However, it has failed to formally adopt the revised draft, as several member states have expressed doubts about the agreement.

In this discussion, a general economic question is asked: Is the protection of intellectual property a necessary precondition for research and development? Will the software industry collapse, building no more new software products, if software patents are not passed? This issue of whether patents are beneficial or not is hotly debated (Hahn, 2002). For example, Beimborn and Hoppen (2004) used a simulation approach, showing that patent protection is globally efficient only in markets with a relatively low profit potential.

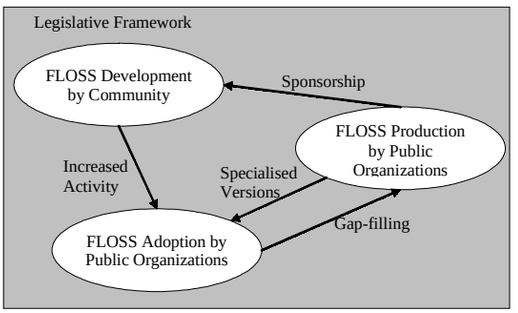
On a grander scale, the ideas of FLOSS are starting to challenge conventional wisdom in fields other than software development (Lessig, 2001, 2004; Perelman, 2002; Vaidhyanathan, 2001). For example, FLOSS-type licenses have been developed for written material, at first for software documentation, later on for scientific material and now in general. There are free academic journals, and whole books on the Web having been placed under such licenses. Even the Freedom of Information Acts, established for example in the U.S. and U.K., could be seen in this light.

## FUTURE TRENDS

Using the main areas of relations as previously defined, we see the following future trends that public organizations will have to face. In the area of adoption of FLOSS, the discussion will be prolonged, and will reach beyond the classical topic of GNU/Linux vs. MS Windows into functional areas in which FLOSS implementations are currently making considerable progress. These will include areas like groupware or content management but also increasingly facets of enterprise resource planning. These trends will lead to an increased number of consulters offering services for FLOSS implementation and support, alleviating some of the current problems. In this situation, choosing the optimal software is a challenging task for a public organization. Any decision-maker is advised to at least consider any FLOSS alternatives for the current situation. In the future, IT investment decisions also in public organizations will and should become more methodologically sound. This includes a thorough evaluation of costs throughout the whole lifecycle, and even a quantification of strategic flexibilities afforded by FLOSS, for example using real options analysis.

The production of FLOSS by public organizations is currently largely not pursued by the normal process of a user becoming co-developer by contributing his own modifications, but by other means including sponsorship. In the future, continuing efforts in sponsorship are to be assumed, as several governments and bodies like the European Union are considering FLOSS licenses for research based on their grants. Increased adoption will also put more pressure on public organizations to become producers of FLOSS themselves, in order to fill any gaps uncovered in the available software, which in turn will strengthen adoption by providing specialized software. This is presumed to take the form of partnerships in several cases, like the cooperation having been announced between Munich and Vienna for the development of a

*Figure 1. Relationships between FLOSS and public organizations*




"public authority desktop." Such initiatives can serve to reduce both costs and risks for the parties involved, and will present a worthwhile option for public administrations.

The regulation of FLOSS will certainly have the biggest effect, both considering policies for mandatory adoption in public organizations, and most notably landmark decisions in the future regarding especially software patents. Such decisions will surely shape the future of the software industry, if not even development of larger issues of intellectual property.

Following, all of these possible relations form a coherent picture for the future, in which the different areas have effects on one another. In particular, we see a positive feedback loop between adoption and production of FLOSS in public organizations, while all areas are deeply affected by the legislative framework installed. These relationships are depicted in Figure 1.

## CONCLUSION

In this article, the implications of FLOSS for public organizations and e-government have been discussed. As this issue of FLOSS and its development has been a hot topic for some years, it has also reached these organizations. As has been shown, FLOSS and public organizations currently interact on many levels, in the areas of adoption, production and legislation, and this situation is not likely to change for some time to come. Therefore an increased understanding of what FLOSS and its development process indeed are, and what the wider implications of this movement, even beyond the software industry, might be, is a necessary step.

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## KEY TERMS

**Free/Libre/Open Source Software (FLOSS):** Software under a license which grants several freedoms to the user, most notably access to the source code, possibility for modifications and free redistribution.

**Free/Libre/Open Source Software Development:** A collaborative form of software development, which postulates that a large number of developer-turned users cooperate under a model of rigorous peer-review and take advantage of parallel debugging that leads to innovation and rapid advancement in developing and evolving software products.

**Free/Libre/Open Source Software License:** A license which grants several freedoms to the user, most notably access to the source code, possibility for modifications and free redistribution. Software under such a license is called free/libre/open source software.

**GNU General Public License (GNU GPL):** A FLOSS license advocated by the GNU project, which enforces copyleft. This means that every copy of the software, even if it has been modified, must be under GNU GPL.

**Network Externalities:** An economic term describing the effect that a product's value to a consumer changes as the number of users of the product changes.

**Real Options Analysis:** A modern investment appraisal strategy, which argues for including any flexibilities available to the management inherent in a project into the project's value using option-pricing theory. Possible real options in IT projects would be to defer investment, cancel the project or change their scope.

**Total Cost of Ownership (TCO):** In order to correctly assess the costs associated with a given software or other IT asset, the costs during the whole lifetime need to be evaluated. This includes the costs for purchasing, installation, maintenance and also termination or switching.

# Identity Management and Citizen Privacy

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## INTRODUCTION

E-government systems aim to transition traditional paper-based systems to "paperless" digital information systems to automate and streamline government operations and services. This transformation to digital form raises daunting challenges related to protecting identity and privacy of the citizens. Electronic fraud and identity theft are among the biggest risks to an e-government system that may potentially undermine its success. The CSI/FBI 2005 (Gordon, Loeb, Lucyshyn, & Richardson, 2005) Computer Crime and Security Survey reports more than $30 million in losses attributed to theft of proprietary information and more than a $31 million dollars loss related to unauthorized accesses. According to the data collected by the Consumer Sentinel and Identity Theft Data Clearing House, identity theft accounts for almost 40% of the fraud complaints (FTC, 2005). It is estimated that billions of records are available in both private and government databases describing each citizen's finances, interests, and demographics. For instance, personal healthcare information about the diseases and health cases inflicting the general population are available in different places including insurance companies and pharmacies. While accessing such data is important for detecting epidemics and bio-terrorism, such accesses can easily encroach into citizen privacy. This demands a balancing act in dealing with issues related to privacy, accountability, national security, and/or good governance. Because of the heterogeneity of an e-government system, the task of protecting identity information as citizens interact with different sub-systems becomes exacerbated. Users typically may need to maintain multiple identities or complete anonymity while interacting with multiple interoperating systems raising severe privacy and identity management problems. For an e-government system to be reliable, and hence successfully deployed, the privacy and identity management issues need to be properly addressed and incorporated in its infrastructure design.

Privacy may be defined as *"the right of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated"* (Jajodia, 1998). Thus, unlike security, which is *organization-centric,* privacy is a *person-centric* concept and refers to the control that an individual has over the use of his or her personal information. One aspect of the privacy problem is the anonymity of the users, which is aimed at protecting the *identity* of the users. The *identity* of an individual is a collection of personal data associated with the individual that uniquely identifies him or her. Associated with each identity is a set of attribute-value pairs, also known as *credentials*, typically representing a user's qualifications and personal attributes including sensitive personal information such as name, age, and social security number. The capability to identify entities (subjects, objects, and resources) is essential in order to know what to protect from whom. Depending upon the context, a subset of the identity may be used to signify an individual. Such a "*partial identity*" is typically bound to the individual with a *pseudonym* (Köhntopp & Berthold, 2000), and may or may not uniquely identify the individual. Typically, multiplicity of identities for individual entities becomes necessary because of the requirements of anonymity, personal data protection, and controlled access to resources in multidomain e-government systems. Moreover, the notion of privacy and identity is inherently complex and may often be contradictory; furthermore, each stakeholder could have a different perspective on them. In large multidomain e-government system, identity management would typically aim towards providing mechanisms that ensure identity dependability to build and maintain trust and confidence between the interacting entities.

## E-GOVERNMENT PRIVACY AND IDENTITY MANAGEMENT ISSUES

An e-government provides citizens with services that involve processing their personal information. With more and more personal information being stored in multimedia format (text, image, audio, and video), much heightened socio-psychological concerns with regards to privacy can be seen. Privacy vulnerabilities arise even if data is available in statistical or aggregate forms, or that allow personal information to be inferred. Furthermore, the fact that the government can carefully monitor every transaction and resource accesses made by a citizen can discourage citizen participation, thus affecting successful deployment of e-government systems. Compared to the general e-commerce environments, the e-government systems have increased obligation/responsibility towards maintaining privacy of the citizens (Dempsey, 2003).

### Challenges

Several privacy and identity management related challenges exist that need to be addressed to ensure the success of an e-government environment.

#### Privacy Policy Specification

Development of a comprehensive privacy policy specification framework is a major challenge. There is a need for an expressive privacy policy specification and enforcement framework that supports flexible, fine-grained policy specification, and facilitates auditing and monitoring while maintaining scalability as well as cost-effectiveness. In particular, users' privacy preference could be very diverse, and could depend on the context and purpose of use of personal information. In general, natural language based specification would be immensely desirable but it can introduce severe problems in machine-readability, introducing difficulty in removing ambiguity and consistency in the policies. Formal, expressive languages are necessary and should be augmented with scalable correctness evaluation tools to facilitate proper administration and enforcement of privacy policies.

#### Active Content

One privacy challenge is introduced by Internet technologies such as Web browsers, whose vulnerabilities can be exploited to compromise privacy. For instance, cookies, the data stored on the client's machine and exchanged between the clients and the server to maintain connection information, can be used for the purpose of gathering user information. Use of executable content such as Java applets and ActiveX controls is another source of security vulnerability, that could be used to obtain personal information. Tools and techniques to ensure that such active content does not violate privacy requirements of users are crucial.

#### Multidomain Environment

Two characteristics of e-government services exacerbate privacy and identity management problems: (1) sharing of citizens' information among different government agencies and (2) differing privacy preferences of the citizens, heterogeneous privacy requirements of different e-government sub-domains, and potential use of identities to access different e-government sub-systems. While facilitating citizens' services, e-government domains may need to exchange users' information, including their identities and credentials. Further, the domains' privacy policies themselves may need to be integrated to provide transparency of the underlying privacy-preserving information sharing activities. Diverse privacy requirements of the citizens need to be addressed by the e-government infrastructure to ensure that all citizens feel safe to interact with the e-government systems. Further challenge is to facilitate unknown users to interact with e-government systems raising trust issues coupled with privacy requirements. A facility to establish trust between e-government systems and the users without unnecessarily divulging sensitive information is essential. To benefit from different applications one often requires multiple identities, which introduce multiple risks of exposure and fraud. If a user has to authenticate each time he accesses a different e-government sub-systems, it will involve multiple risks of identity theft.

#### Anonymity

Users often prefer anonymity during online transactions particularly when his or her activities can reveal sensitive information about him or her. A partial identity that cannot be used to uniquely identify an individual provides a degree of anonymity. Anonymity does not imply that no information is released; instead, the released information should not reveal the actual identity of a user (Damiani, di Vimercati, & Samarati, 2003).For example, a patient may collect/order medicine from a pharmacist anonymously. Here, the pharmacist should be able to associate the patient's partial identity to the prescription. Some interactions, however, cannot be conducted anonymously, for example when a doctor diagnoses a patient, his or her identity must be uniquely verified and his or her health records must be accessed.

### Information Inference and Privacy

Information inference makes privacy difficult in today's IT environments where different pieces of private information are stored in different sources. Given access to different sets of someone's personal data which are not sensitive, it may be possible to infer unauthorized, sensitive personal information about him or her (Thuraisingham, 2003). Emerging sophisticated data mining tools that can associate different pieces of personal information severely exacerbate the inference problem. For instance, mining of pharmaceutical purchases could indicate that a user is possibly suffering from a particular disease. At the same time, use of data mining tools may be useful for many purposes, such as detecting impending bio-terrorism or furthering discoveries. The key challenge is to ensure balanced use of such tools for privacy protection vs. other benefits.

## Approaches to Privacy and Identity Management

Several technologies that address privacy and identity management issues have emerged which are applicable to e-government systems.

### Privacy-Aware Access Control

A fundamental approach to privacy enforcement is data protection. Privacy can be viewed as contextualized and purpose based access control. Traditional discretionary and mandatory access control (DAC and MAC) have limited capabilities in capturing privacy requirements. Newly emerging advanced role-based access control (RBAC) models show better potential to address the privacy needs by defining roles with "*need to know*" constraints related to private information (He, 2003). Bertino (2005) proposes a *purpose based access control* that determines purpose when data is created and allowed to be accessed. In general, emerging context based access control approaches can be used to enforce privacy requirements.

### Privacy-Enhancing Technologies (PET)

PETs enhance personal privacy by either preventing unnecessary access to information or by allowing citizens to have control over the access to their personal information. Different PETs have been developed to enforce *pseudonymity, anonymity, unlinkability* (cannot link information pieces for inference), *unobservability* (cannot observe effect of an operation), *unlawful/unnecessary* processing of personal information (Borking, 2001). Some of these technologies are new and expensive for practical adoption. Several tools such as *Web anonymizers* and *remailers* currently provide support for achieving some level of privacy. However, there also are tools that offset these, such as *snoopware* that locate personal data on the Web, and *stealthware* that essentially monitors client behavior.

Rigorous guidelines and frameworks are being put in place as a result of the e-government strategies under the *Presidential Management Agenda* (OMB, 2002). Some of the enabling technologies such as *XML key management specification*, X.509 Certificates, Web services trust, Security Assertion Markup Language (SAML), eXtensible Access Control Markup Language (XACML), Service Provisioning Markup Language (SPML), Kerberos, and WS-SecureConversation provide credential, PKI, authentication, provisioning and authorization services that can support privacy enforcement. Existing solutions like IBM's Tivoli software, Microsoft password, Oracle's 10g Oracle Identity Management, Microsoft's Single-Sign-On system, among others, provide components for identity management and provisioning.

### Platform for Privacy Preferences

P3P is an emerging privacy solution that uses *privacy profile management*. P3P essentially allows users to set their Web browsers to read a Web site's privacy policies and set the user's privacy profiles accordingly. P3P is the most widely suggested tool for privacy enforcement (McIver, 2004), and has become the suggested standard in the U.S., Berthold and Kohntopp (2000) use APPEL (A P3P Preference Expression Language) for identity management, using privacy profiles defined by the users themselves. IBM's Enterprise Privacy Authorization Language (EPAL) is an extension of P3P.

### Privacy Assurance

Third party verification of privacy enforcement mechanisms is essential to build citizen's confidence in the system. Some approaches and tools towards this include privacy impact assessments (PIA), privacy commissioners, CPA WebTrust, BBBOnline, and TrustE. (Dempsey, 2003). PIAs should be performed by an agency external to the agency involved in the possible violation of privacy. Privacy Commissioners are the proposed agencies that oversee privacy protection for the nation.

### Policy Integration

An approach to privacy protection includes using sticky policies along with technologies like identity-based en-

cryption (IBE) and Trusted Computing Platform Alliance (TCPA) (Mont, Pearson, & Bramhall, 2003). Technologies such as X.509 Certificates WS-Trust, SAML, XACML, SPML, Kerberos, WS-SecureConversation facilitate policy integration in multidomain e-government environments.

### Inference Control

An approach to privacy is to modify personal data such that private information is not be revealed from the accessed data. For example, an initiative of IBM deals with non-personal demographic data of a group of data with no accesses to any private details. Another similar approach randomizes data such that aggregated information is comparably accurate to the actual data, but with the effect that individual private data cannot be accessed (Clifton, Kantarcioglu, Lin, & Zhu, 2002, Efvimievski, Srikanth, Agrawal, & Gehrke, 2004). Yet another approach is to selectively make data anonymous according to the needs of the uniqueness of the data. An approach used in database applications is to distribute the database such that no private data can be accessed from any one database. Privacy-preserving data mining techniques are commonly used to ensure that information is not inferred by using mining data sets. In particular, such tools aim at modifying or trimming sensitive raw data before mining tools can process them or the knowledge that can be inferred using data mining is excluded by applying some privacy-preserving algorithms (Clifton et. al, 2002).

## Usability, Standards, and Legal Issues

As privacy issue is inherently person-centric usability and human factors, as well as socio-legal and standardizations issues related to privacy need to be properly addressed to build a comprehensive privacy protection framework.

### Usability, Human-Factors

Technology, however good it is, may be wasted if it is not adopted by users, and this is particularly applicable to privacy. Hence, a privacy framework should emphasize the usability factors. Studies have shown that many users are unaware of privacy rights and enforcement tools. Others believe that privacy is not a big enough concern to worry about (Brodie, et al., 2005). The primary reason for this is the lack of awareness of the privacy enforcement solutions and the lack of proper interfaces for privacy policy specification. A recent study carried shows that usability aspects should address the following key features, (Cranor & Garfinkle, 2005):

- **Language of Specification:** Natural language or machine readable language depending on the proficiency of the user
- **Complexity of the Preferences:** Privacy preferences are context-dependant and privacy is sometimes traded because of the difficulty of specification
- **Presentation of Laws and Regulations:** Users should easily understand what privacy rights they have
- **Efforts and Learning Curve:** Users should be required to put in minimal efforts in learning privacy solutions
- **Visualization of the Policy:** Users should be able to view the policy they have specified, be it through use of icons, natural language statements or even graphics

### Standardization and Legal Issues

With the abundance and diversity of different systems, different standards have come to existence. For example, NIST SP 800-25 provides guidelines for PKI technology for digital signatures and authentication for federal agencies. E-authentication service component was established as a part of the E-Authentication Initiative by the General Services Administration (GSA) Office of Government-wide Policy (OGP) to enable trust and confidence in e-government transactions through the establishment of an integrated policy and technical infrastructure for electronic authentication. Through this initiative, citizens, businesses, and governmental entities are expected to have simpler access to multiple agency applications through the re-use of credentials and established identities. However, a major challenge still facing identity management remains one of uniformity between different standards and trust establishment mechanisms. Non-conformity between standards still exists due to dissimilarity of government agencies. A solution is to use standardized smart cards. In particular, auditing requirements for the identity management system that provides some degree of "*identity assurance*" is desirable. A solution proposed is that of using a federated identity management (FIM); however, it is limited to Web-services based infrastructure only (Shin, Ahn, & Shenoy, 2004). The emerging compliance requirements such as HIPAA, Gramm-Leach-Biley Act, Sarbanes-Oxley, EU Data Protection Directive, and California Bill 1386, have exacerbated the privacy problem.

Privacy policies are typically based on the country's privacy laws. For instance, in the US, the privacy policies are guided by *Section 208 of the E-Government Act of 2002.* Several guidelines, such as the *Principles of Fair Information Practices* have been defined for enforcing privacy policies. Other constitutional acts such as *Sec-*

*tion 208 of the U.S. E-Government Act*, 2002, the *EU Data Protection Directive*, 1995, and so forth, outline the privacy requirements expected of any information system service. Unfortunately, the 2004 Global E-Government report shows that only 14% of e-government systems implement privacy policies. A challenge to privacy policy development is its conformance to the country's legal, social, and ethical environment. Some countries do not provide citizen privacy at all (McIver, 2004).

## A Privacy Framework

Figure 1 presents a comprehensive framework for privacy and identity management.

### The Non-Technological Plane

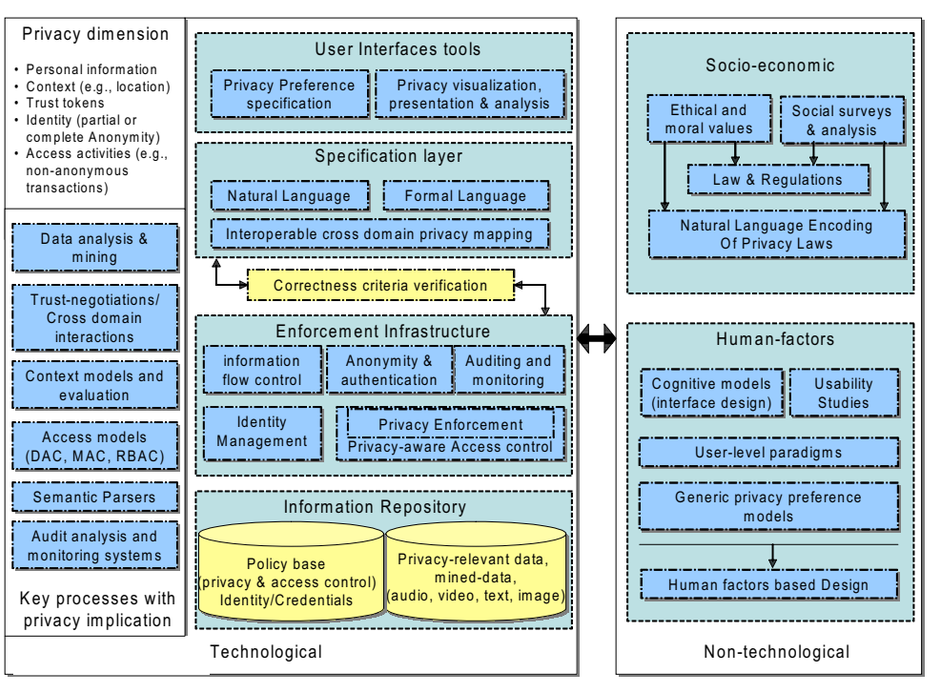
This aspect of privacy refers to the socio-economic and human factors that have significant privacy implications. A key issue is to capture the legal and socio-economic factors into the privacy policy guidelines. Similarly, cognitive models of user's perception of privacy and interface requirements, generic privacy preference models and usability studies should derive the human-factors based design principles that should be incorporated into the development of privacy solutions.

### The Technology Plane

The components of this layer are the technologies and technical concepts associated with privacy protection. Effective user interfaces are crucial for deploying usable privacy solutions. In particular, tools are needed to facilitate specification of users' privacy preferences, and their presentation (e.g., visualization techniques). The specification layer primarily contains language technologies (NL-based/XML/SAML) that provide efficient machine readable encoding of both the users' privacy preferences and the domains' privacy policies to ensure privacy-preserving interactions. Correctness verification of specified policies and policy mappings is essential and primarily includes static analysis of consistency and safety issues.

The enforcement infrastructure contains key components required to enforce privacy policies, auditing functions, identity management procedures, and anonymity/authentication functions. The information repository (IR) includes information that has privacy implications. Note that access control and privacy policies themselves are included in IR. For instance, revealing policies during trust-negotiation could also reveal sensitive private data. The correctness verification module supports the enforcement mechanisms to handle dynamic constraints.

*Figure 1. A comprehensive privacy framework*



Various mechanisms and processes that have privacy-implications are shown on the left block. Techniques to address privacy concerns raised by these need to be properly synthesized in the specification as well as enforcement layers. For instance, consider the inference problem associated with data mining. This can be addressed by the information a flow control module. Alternatively, as new information is mined, new access control policies could be dynamically generated to ensure that such inferred sensitive information is not allowed to be accessed.

The key privacy dimensions include: *privacy of personal information*, *anonymity*, *context privacy*, *trust token privacy,* and *access privacy*. First two deal with selective protection of personal information and identity. Context privacy deals with the privacy of a user's current context (e.g., location information). Trust token privacy is associated with trust negotiation mechanisms and refers to the privacy of the various credentials that are not involved in trust negotiations; these may include personal information as well as other profile information. Access privacy refers to privacy of access activities.

## CONCLUSION

In this article, we have discussed various challenges and existing solutions related to privacy and identity management. Solutions for these challenges are new, have not matured, and have not yet been synthesized into a comprehensive solution that is desirable for an e-government system. Identity management and privacy issues thus have the potential to pose a roadblock to the successful deployment of e-government systems. We have also presented a comprehensive privacy framework that integrates the non-technological and technological components. Such a holistic framework is essential to enable a high assurance privacy protection infrastructure for an e-government system.

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## KEY TERMS

**Inference Problem:** Inference problem refers to the situation when different pieces of less sensitive information about some entity reveal a more sensitive piece of information about it.

**Privacy-Enhancing Technologies:** Technologies that enhance personal privacy by either preventing unnecessary access to information or by allowing users to have control over the access to their personal information.

**Privacy Impact Assessment:** A formal process to identify and assess privacy implications and its impact.

**Privacy:** The right of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated.

**Privacy-Preserving Data Mining:** A data mining mechanism that ensures mined data contain no sensitive personal information.

**Security Assertion Markup:** An XML standard for exchanging authentication and authorization data between security domains.

**Trust Negotiation:** A mechanism of establishing trust between strangers that involves selective exchange of sensitive credentials to establish mutual trust

**Usability:** The degree of user-friendliness and convenience or ease of use of a technological solution.

# Information and Communication Technology and Good Governance in Africa

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## INTRODUCTION

The 20th and 21st centuries have witnessed major paradigm shifts in the conceptualization of development and governance. These phenomena are aided and propelled by a new "network intelligence" consummated in the introduction of information and communication technology (ICT). The world has also witnessed a reinvention of the whole process of governance that has impacted society in various ways. Through the Internet and digital connectivity, today's world has come to be closer than ever before. Efficiency and processes of governance have been improved through faster information flow in the governance chain. Bottlenecks and cost of labor have been reduced across the world. Furthermore, ICT has opened new possibilities, improved transparency and access to information as well as partnership and collaboration, leading to improved relationships between the citizen and state. While Europe and North America, as well as some countries of Asia and the pacific, have taken advantage of this development to improve their economies and governance process, Ningo (1999) observes that sub-Saharan Africa has remained either passive or in the periphery, often reduced to a consumer for reasons related to its history or its system of governance—or lack of one. This has led to a yawning digital divide (especially between Africa and developed states of the world.

What led to this divide and how can Africa, then, benefit from this revolution? What are the obstacles?

## BACKGROUND

Such historical factors as colonialism and associated exploitative orientations and, more recently, military dictatorship and neo-liberalism have dominated the literature of Africa's political economy as explanatory framework for underdevelopment. Little has been blamed on the problems of state interventionism that characterized the post-independence period and that appear to have exposed the weakness of the state in Africa to manage its resources and deliver services, thereby leading to underdevelopment and poverty. Even at that, the prognosis and taxonomy of the post-cold war developments in Africa still lean on such templates. In fact, African scholarship has continued to heap blames for underdevelopment on doors of liberalism, mercantilism and their "center-peripheral" characters. According to Bathily (Nnoli, Ed., 2000, p.49), "It appears clearly that the crisis of the post-colonial state is not directly caused by state intervention in the economy." To that extent, Bathily contends that the solution to this crisis cannot be generated by the mere restoration of the so-called macro-economic equilibrium.

The current Africa's problems have also been traced to corruption and bad governance (World Bank, 1989). Identification of these problems and their impediments to political and economic development have led experts, scholars, organizations and agencies to show concerted interests towards paradigm shift and reinventing governance. The move is borne out of the genuine conviction that there is a correlation between bad governance as witnessed in Africa and other parts of the world and over-centralization. This correlation also extends to governance and problems of war, poverty, corruption and human security. Consequently, these have led to various dimensions of inequality and growth below the world's minimum standards for economic development. According to Adedeji (2002), African performance in 1960-1975 was substantially below all the targets set by the United Nations (UN) Second Development Decade. Its GDP annual growth was 4.5% instead of the 6.0%; its export was 2.8% instead of 7.00%; its agricultural growth rate was 1.6% instead of 4.00%; while manufacturing grew at 6.0% instead of 8.00%. Import was 10.0% instead of 7.0%. This, according to Adedeji, reveals that Africa was faced with development crisis. Unfortunately, performance during the one-quarter of the 20th century (1975-2000) was more abysmal than that achieved during the first 15 years of independent Africa (1960-1975). It is postulated that if Africa has to exit from poverty and develop, it needs a growth rate of 7.0% per annum (Adedeji, 2002). The following data demonstrate Africa's growth rate and prospects from 2002 to 2006.

It is the contention of scholarship also that this bad governance could be averted if there is culture of accountability, transparency, as well as commitment of political leadership to deliver services to the governed.

*Table 1. Real GDP growth rate of developing countries (International Development Economic Associates, 2005)*

| | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|
| East Asia and Pacific | 6.7 | 7.9 | 7.8 | 7.1 | 6.6 |
| Europe and Central Asia | 4.6 | 5.9 | 7.0 | 5.6 | 5.0 |
| Latin America and the Caribbean | 0.6 | 1.6 | 4.7 | 3.7 | 3.7 |
| Middle East and North Africa | 3.2 | 5.7 | 4.7 | 4.7 | 4.5 |
| South Asia | 4.6 | 7.5 | 6.0 | 6.3 | 6.0 |
| Sub-Saharan Africa | 3.1 | 3.0 | 3.2 | 3.6 | 3.7 |
| **All Developing Countries** | **3.4** | **5.2** | **6.1** | **5.4** | **5.1** |
| – excluding transition countries | 3.2 | 5.1 | 5.9 | 5.4 | 5.1 |
| – excluding China and India | 2.1 | 3.8 | 5.4 | 4.6 | 4.3 |

*Table 2. Actual and projected long-term growth of per capita GDP (in percent) (International Development Economic Associates, 2005)*

| | 1980s | 1990s | 2000-06 | 2006-15 |
|---|---|---|---|---|
| World Total | 1.3 | 1.1 | 1.6 | 2.1 |
| High-Income Countries | 2.5 | 1.8 | 1.7 | 2.4 |
| Developing Countries | 0.6 | 1.5 | 3.4 | 3.5 |
| East Asia and the Pacific | 5.8 | 6.3 | 6.0 | 5.3 |
| Europe and Central Asia | 1.0 | -1.8 | 5.2 | 3.5 |
| Latin America and the Caribbean | -0.9 | 1.5 | 0.8 | 2.4 |

*Table 3. Percentage of population living on less than $1.08 per day (Chen & Revallion, 2004)*

| REGIONS | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 | 1999 | 2001 |
|---|---|---|---|---|---|---|---|---|
| East Asia | 57.7 | 38.9 | 28.0 | 29.6 | 24.9 | 16.6 | 15.7 | 14.9 |
| Eastern Europe and Central Asia | 0.7 | 0.5 | 0.4 | 0.5 | 3.7 | 4.3 | 6.3 | 3.6 |
| Latin America and Caribbean | 9.7 | 11.8 | 10.9 | 11.3 | 11.3 | 10.7 | 10.5 | 9.5 |
| Middle East and North Africa | 5.1 | 3.8 | 3.2 | 2.3 | 1.6 | 2.0 | 2.6 | 2.4 |
| South Asia | 51.5 | 46.8 | 45.0 | 41.3 | 40.1 | 36.6 | 32.2 | 31.3 |
| Sub-Saharan Africa | 41.6 | 46.3 | 46.8 | 44.6 | 44.1 | 45.6 | 45.7 | 46.4 |
| **Total** | **40.4** | **32.8** | **28.4** | **27.9** | **26.3** | **22.8** | **21.8** | **21.1** |

## STEPS TAKEN TO ACHIEVE GOOD GOVERNANCE

Various steps have been taken at the national, regional and global levels to address the problems of bad governance in Africa. At the global level, there is a general call for democratization and economic reforms that could entrench a regime of accountability, transparency and culture of trust. Institutions, such as the World Bank, International Monetary Fund (IMF) and donor nations, have not minced words on these virtues as conditions for granting any form of aid to Africa. They have even extended their definition of governance to include a redefinition of the state, the de-politization of public administration and involvement of non-governmental organizations.

At the regional level, there have been concerted efforts at political and economic integration as well as such programs as the New Partnership for Africa's Development (NEPAD), which is designed to use its Peer Review Mechanism and ICT as tracking tools against bad governance. Through this process, NEPAD will help eradicate poverty and empower African states to develop.

At national levels, states of Africa have various provisions in their constitutions and have introduced various institutional measures and anti-corruption agencies

to check bad governance. In spite of these efforts, corruption and bad governance continue to ravage the continent, leading to abject poverty. The main thrust of this article, therefore, is to establish how ICT can help achieve good governance in Africa and bridge the divide in overall development (but also the digital divide) between the advanced industrial countries and Africa.

## ICT AS A ROAD MAP TO GOOD GOVERNANCE IN AFRICA

While good governance could be achieved through efficient management of the nation's resources, entrenching a culture of trust, accountability and transparency, we argue that ICT could be a veritable tool of making the above factors possible. ICT in governance has been defined as "the use of Information and Communication Technology to support the act and process of governance through the provision of improved administrative systems within and without government" (Duncobe, 1999) in Emadoye (2002, p. 1). On the other hand, governance is an exercise of political, economic and administrative authority to manage a nation's affairs (UNDP, 1997). It is the complex mechanisms, processes, relationships and institutions through which citizens and groups articulate their interests, exercise their rights and obligations, and mediate their differences. This poses the concept of governance in two dimensions (good and bad). But we are concerned with good governance. This, the United Nations Development Program (UNDP) argues, has to do with effective management of public resources in response to the critical needs of the society. According to Cloete (2001, p. 4), good governance is "the achievement by a democratic government of the most appropriate developmental policy objectives to sustainably develop its society, by mobilizing, applying and coordinating all available resources in the public, private and voluntary sectors, domestically and internationally, in the most effective, efficient and democratic way". According to Cloete, this latter definition contains both empirical and normative utilitarian approach. It is also a reflection of the current academic state of public administration/management.

Having said this, it is important to note that no matter how defined, good governance must take care of the principles of responsibility, accountability, transparency, trust and efficient service delivery – all channeled towards the improvement of the welfare of the governed. It is being emphasized, because good governance provides an enabling environment for economic development, political participation, social inclusion, equity and quality of life of citizens. These issues generate broad consensus in society and reduce the problems of war and violence; it reduces poverty by creating employment opportunities through investment and guarantees human security. It creates an atmosphere of freedom, develops talent and ingenuity, reduces fear and throws open windows of opportunity to both domestic and foreign investors.

The above background suggests one basic question. In what ways can ICT be used to achieve this good governance? In other words, what is the instrumental utility of ICT to improveme peoples' welfare, hold government accountable and achieve a responsible, efficient and transparent public administration that could deliver services?

Backus (2001) writes that ICT can be involved in governance in two major dimensions: internally and externally. Internally, it facilitates speedy, transparent, accountable, efficient and effective process for performing government administration activities. Externally, it facilitates speedy, transparent, accountable, efficient and effective interaction with the public, citizens, business and other agencies.

Duivenboden (2002) agrees that ICT could create new ways of service delivery through multi-challenging information supplies. It could equally influence the behavior of governments in their relations with citizens to a certain extent. Duivenboden admits that electronic governance (e-governance) could lead to increased access of citizens to government information and increase the process of transparency. E-governance also saves time and money for both citizens and the state.

Cloete (2001) emphasized the importance of electronic management assessment tools and their use to improve policy outcomes and service delivery. He observed that the poor state of these tools have led to policy failures and poor policy implementation in most developing states. ICT, according to Uma (2004), enables the government to reinvent itself, get closer to the citizenry and forge closer alliances and partnerships with diverse communities of interest, practice, expertise, conviction and inter-dependence within the context of national agendas. Backus (2001) writes further that the objective of e-governance is similar to the objectives of good governance: Good governance is the exercise of economic, political and administrative authority to better manage affairs of a country at all levels, national and local. Many other ways have also been identified as roadmaps to good governance via ICT:

### Citizen Participation

The introduction of ICT (including the widespread use of the Internet across the world and its increasing use in Africa) has proven to be a major way of increasing public

participation in the governance process. E-governance through ICT is a major roadmap towards defining a society's vision and priorities for e-government. ICT facilitates electronic democracy—voting; public opinion polls; policy inputs; campaigns; payment of taxes; political contacts, especially with elected leaders; networking; as well as advocacy. According to the Pacific Council on International Policy (2002), participation requires collaboration, especially between the private sector and civil society groups that may possess the much-needed expertise and resources. Participation makes it possible for citizens to evaluate government services openly. This enables the government to make improvements in its services and policy process. Good governance in Africa could be facilitated through this process of participation, as it would enable the average African to make input into policy process and generate confidence and trust in the political system. The overall consequence may be political stability and economic development. Experiences from across the world reveal that ICT can be instrumental to community development, improved access to information and public-private partnership, and all of these can also be of tremendous benefit to Africa.

## Community Development

ICT in Africa could lead to information sharing, local administration, healthcare service delivery, and accessing information needed at localities without traveling to the state or nation's capitals. In Africa also, ICT could be used by civil society organizations to inform people in the localities about their rights and privileges, and so forth. The effect of this is the empowerment of the civil societies to checkmate their governments and hold them accountable for their responsibilities. This is a major way of guaranteeing transparency and good governance.

## Access

ICT in Africa can create access to information about the entire political process, services and choices available. Government agencies can equally use ICT facilities to advertise their activities, programs and plans, as well as achievements. It can also be used to announce jobs and opportunities on Web sites. Citizens can submit applications online and fill out forms. Though this access still follows the digital divide between developed and developing states, among African states as well as in their urban and rural centers, its benefits are numerous if made possible. The divide also has its gender dimension, since speculations are that women have less access to ICT worldwide.

## Partnership

Through ICT in Africa, a feeling of ownership of policy process, legitimacy, and sense of efficacy and patriotism will be generated. As states in transition, it can help in forging a closer and stronger partnership between public and private sectors.

It can also be possible to transact business and send messages faster than ever before in Africa. Though connectivity is still abysmal, such facilities as e-mail, fax and cellular telephones, digital television and radio have been of immense benefits. Cost-effective administration (through microelectronics, fiber optics, video compression, fast-packet switching and high-density storage technology, reduction in the volume of files and of the cost of labor) has been enhanced.

Finally, ICT in Africa, like in other parts of the world, has led to information gathering for intelligence, national security and ecological monitoring, not only to manage natural disasters but also for improvement of agriculture.

Having outlined how ICT can benefit Africa and improve governance, it is noteworthy to state that ICT is like the theory of the hammer, which the carpenter can use for good, bad and ugly. This understanding informs part of its special constraints. Ningo (1999) suggests that Africa should take advantage of the development of ICT, since it offers a dramatic opportunity to leap-frog into the future and break out of decades of stagnation and decline. In this regard, Hegener (1996) warned that if Africa cannot take advantage of the information revolution and surf this great wave of technological change, it may be crushed by it. This, he argues, will lead to greater marginalized and economic stagnancy in the future. Ronfeldt (1992) also suggested that governments that succeed in using the information revolution and its associated technologies to develop advanced information and communication infrastructures may leap ahead of others in terms of their capacity to deal with current issues, assert their presence, build cooperative networks and partnerships, and cope with competition and conflict at home and abroad.

# THE FUTURE OF ICT IN AFRICA: PROBLEMS AND CONSTRAINTS

The introduction of ICT at least brings the hope that if adopted and properly implemented, African states can transform from a culture of distrust, dishonesty and mismanagement to that of transparency and accountability that will encourage an efficient and cost-effective public administration and good governance. It will also enable the continent benefit from the present UN Millennium Development Goals.

While this is admissible, it is important to note that peculiar environmental factors may constrain the extent ICT will determine the roadmap to good governance in Africa. Though these factors are not peculiar to Africa, their presence is widely engrossed and their effect severe. The following factors could hinder Africa's dream and disrupt this roadmap to political and economic development.

## Problems

### Lack of Infrastructure

Infrastructure is essential to successful ICT procurement and sustenance. These include legal recognition and acknowledgement of electronic data as legal documents, electronic signatures, issues of piracy and intellectual property rights, and procurement policies. These require legal reforms and broad policy frameworks that are yet to be developed in most African states.

### Telecommunication

Most African states are still below the world minimum in accessibility to telecommunications. It was found out that Africa has only a 13% share of the world population. Out of this number, only 1% has total global telephone lines, 1% Internet users, 1.2% of total world Internet sites, and almost 0% of global ICT production. With an estimated 274,742 hosts in 2001, Africa has 0.19% of the total global Internet hosts, while its share of personal computers stood at 7,558,000, representing 1.53% of the world total (United States Internet Council, 2001). There is no gainsaying that without this facility, electronic governance, democracy and commerce will be hampered. While in many African states the telecommunication industry has been liberalized, still, the cost of access to these facilities are yet to be within the reach of majority, especially when telecommunication companies are constituting themselves into new monopolies, thereby defeating the essence of liberalization. Even at that, the distribution of the telephone is not only skewed in favor of urban residents, especially the urban elites, but the digital divide continues to increase between the urban and rural dwellers. This divide has also proven to be generational. While African youths appear to be more ICT literate, a greater percentage of elders appear to be behind this new technology.

### Lack of Knowledge Jobs

There is still a gross lack of technical manpower in the field of information technology (IT). This affects not only software maintenance, but also development of new ones and manufacturing of accompanying hardware. IT facilities need to be properly set up, computers repaired and serviced. To a large extent, trained manpower for these services are in short supply. In some offices, where computers are available, they serve the purpose of decoration. Even at homes, generational gaps also exist in their use. Older people feel it is not their business. Younger ones get more interested. Unfortunately, it is the older people that occupy most sensitive positions in the public and private offices.

### Poverty/Cost

Poverty is still a major handicap in access to ICT. Most Africans cannot access the Internet or own telephones or other digital receivers, because they are unaffordable. Because of this lack of access, most cannot benefit from various online facilities, such as information, education, e-commerce and so forth. This could endanger the future of ICT benefits for good governance in Africa. Computers are very expensive and, in many cases, unaffordable to the average person.

Another major effect of this poverty in Africa is the use of IT to achieve an inter-generational shift in corruption. The few cyber-cafes that are available are owned by private persons and are often filled with young men and women scamming to defraud – a technique unknown to the older generation and a more sophisticated form of corruption. Employing such people in government offices will offer opportunity for new forms of fraud in the future.

### Civil Wars

Available statistics show that many states in Africa are deeply engrossed in civil wars and political instability. The report of the UN Secretary General (April, 1998) shows that since 1970, more than 30 wars have been fought in Africa, most of them intra-state in origin. In 1996, 14 out of 53 countries in Africa were experiencing armed conflicts that accounted for more than half of all war-related deaths globally This creates environmental problems that are hardly ideal for the development of ICT. Mostly, these states are more committed to basic survival, containing insurgency and fundamentalism than development of ICT infrastructure.

### Electricity

In such countries as Nigeria, electricity supply is grossly irregular. In many cases, electricity supply is erratic. It comes on and off. This not only slows progress and development, but also inflicts serious damage to computers and their software. The future of IT development in Africa could be endangered by the poor energy sector existent in many states of Africa, coupled with the fact that many rural communities have no electricity.

Then, there is the lack of most governments' willingness to set up public information centers for cheaper and easy access to information and business transaction. This is not because the government policy makers do not acknowledge the benefits of these; but, lack of patriotism and corruption stand in their way, disposing them to be unwilling to invest where there are no direct cash rewards.

### Lack of Space for Open Comments

This might look minor or ignorable, but it is very important. In designing Web sites, most agencies and organizations hardly create open space for exchange of information and comments on government policies. What government and its agencies do is tell people what they want them to know. This channel is closed for the fear of criticisms arising from the public as well as challenge of policy options. The future of ICT in Africa faces an uphill task in the challenge of the above constraints.

### Policy Dichotomization

In some African countries, ministries of communications are separated from those of technology. This keeps IT and communication technologies as separate issues. In Nigeria, for instance, ICT understanding is narrowed down generally to just computers and Internet. There are three separate policies on IT. IT and Broadcasting have different regulatory bodies (Ya'u, 2001). According to Ya'u, this not only creates problems in terms of coordination between the various agencies and resulting duplication of efforts, but also does not allow the countries to tackle the issues of convergence that ICT represents. This dichotomous stance was exemplified when ministers responsible for economic planning were meeting with the Economic Commission for Africa (ECA) in May 1996 to conceptualize the African Information Society Initiative (AISI). That same month, the Ministers responsible for telecommunications were meeting in Abidjan to agree on the green paper outlining the Telecommunication Policies for Africa (Apeworkin, 2001). Again in Nigeria, while the Minister for African Integration was representing Nigeria in the African Development Forum (ADF'99), the Minister for Telecommunications was releasing the National Policy on Telecommunication in Abuja with no reference to what was going on in Addis Ababa (Ya'u, 2002).

## PROSPECTS OF ICT IN AFRICA

Leaderships have at least demonstrated some desires to embrace ICT. For instance, there have been numerous initiatives to embrace ICT and bridge the yawing gap at both international and domestic levels. The World Bank, UNDP and even the Group of Eight initiate some. These have led to modest improvement in connectivity in most African states. By 1995, only six African states had the Internet, but by 2002, virtually all had access to the Internet (Ya'u, 2002).

In spite of these modest improvements, the reports of the Organization for Economic Cooperation and Development (OECD, 2001) and the US Internet Council (UIC, 2000) showed that the divide between Africa and other developed parts of the world is still on the increase. This position leaves us with one major, disturbing question. Will Africa ever catch up and bridge the divide in IT? Mansell and Wehn (1998:25) said it will take at least a century. Cogburn and Adeya (1999, p. 12) sounded even more pessimistic. According to them, "it is an illusion to think that ICT-poor countries can 'catch up' or keep pace with advances in the most technologically advanced countries." Even the efforts through NEPAD did not seem to win the confidence of some scholars. According to Ya'u (2005, p. 8), "NEPAD is symptomatic. There is nowhere in the document in which the ways ICTs are reinforcing existing global inequalities or how the challenges e-commerce is posing to developing countries are factored in the discussion on bridging the development gap." He blamed Africa for taking the matter on its surface level without taking into consideration its historical roots and for thinking that the gap can be bridged just by promoting access for foreign investors in ICT industry by removing for them import duties, taxes and breaks as well as holidays, and reducing itself to consumerist status. The extent to which Africa can catch up therefore, will depend on the level of its leadership commitment to achieving good governance that will enshrine principles of transparency, accountability and service delivery. It is in realization of these virtues that words could be matched by action that could bring Africa nearer to actualization of digital technology and bridge its consequent divide.

## CONCLUSION

The World Bank (1994) had noted that the future of economic development and good governance are hinged on ICT. Africa needs to translate this prediction from mere expression of interest to concrete efforts at bridging the digital divide, not only between the continent and the rest of the world, but within Africa itself, between rural and urban dwellers. For instance, while 29 members of the OECD share 97% of Internet hosts, 92% of the market in production and consumption of computer hardware and software services and 86% of all Internet users, the whole of Africa contain only 2.5% Internet users, or less than 1%

of the world's online community (Norris, 2000). This calls for indigenous investment in the ICT sector, with the hope that it will positively impact on governance process. This is a major way of getting through the center-periphery model of development that has beset Africa since the period of colonization. It is equally important to note that the problem of governance does not solely lie in lack of technology. Effective use of technology calls for improvement in various governance infrastructures that will not only enable this technological acquisition but its productive usage. This, therefore, calls for the ICT knowledge society. It is observed that one of the fundamental reasons for the absence of good governance in post-colonial Africa is the sheer incapacity of its bureaucracy to discharge its duties (Chabal, 1992). With creation of a knowledge society and the positive use of IT, the bureaucracy may be better positioned to discharge its roles and deliver services. If Africans can see ICT as an innovation for the common good and adjust from the current culture of greed to that of using the new technology to track bad governance, then the benefits will be tremendous and the future bright. The problem of ownership of ICT may not even constitute an impediment.

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## KEY TERMS

**Bureaucracy:** This refers to the personnel and administrative structure of an organization. Business, labor, religious, educational and governmental systems depend on a large workforce arranged in a hierarchy to carry out specialized tasks based on internal rules and procedures. The term is used mostly in referring to government administration, especially regarding officials in government and civil services. It is often used pejoratively to suggest waste, inefficiency and red tape (Encarta, 2003). In sociological theories, bureaucracy is an organizational structure characterized by regularized procedure, division of responsibility, hierarchy and impersonal relationships. The term can characterize either governmental or nongovernmental organizations.

**Cyber Café:** "Cyber" is anything related computers or networking. Cyber Café, though, used in exchange with Internet café, is expected to be a coffee shop that offers computer terminals for customers to browse the Internet while sipping coffee. It is a colloquial concept that is fast becoming an accepted formal language.

**Globalization:** The process by which markets and production in different countries are becoming increasingly independent due to the dynamics of trade in goods and services and flows of capital and technology (European Commission, 1997). Globalization involves much more than economic transaction and spans into political, social and cultural issues. Economic globalization has to do with a borderless global economy, in which the principal agents are the multi-nationals, which are disembodied from any national base. Political globalization refers to the withering away of the state. Cultural globalizing refers to the present global village that watches more or less the same television serials and videos, consumes or aspires to consume the same products. Social globalization refers to the homogenization of today's mode of life, which is based on an individualist and consumerist culture. As a result of globalization, social geography gains a planetary dimension. "Place" comes to involve more than local, provincial, country, regional and continental realms. With globalization, the world as a whole also becomes a social space in its own right (Encarta, 2003).

**Governance:** The term governance has not received any universal fit-all definition. The best we have are working definitions by international organizations, which in most cases lack underlying theories. The UNDP defines governance as "the exercise of political authority to manage a nation's affairs. It is the complex mechanisms, processes, relationships and institutions through which citizens and groups articulate their interests, exercise their rights and obligations and mediate their differences." In keeping with this, it defines sound governance as effective and efficient management of public resources and an adequate response to critical societal needs. It also denotes democratic forms of relationships between the governed and the governors, relationships that have inbuilt mechanisms for public participation, accountability and transparency. It is contended that systems that incorporate the above elements have been better able to satisfy broad societal needs, including sustainable human development (Economic Commission for Africa, 1988). It can also represent decision-making processes in the administration of an organization. Governance also refers to the process whereby elements in society wield power and authority, and influence and enact policies and decisions concerning public life, as well as economic and social development.

**Human Security:** Human security has been looked at from two primary perspectives. From the narrow perspective, it has to do with protection of individuals and communities from violent threats and internal conflicts. The broad perspective defines it to include threats of hunger, poverty, exclusion and natural disasters.

**Internet:** Internet is a collection of computer networks that operate to common standards and enable the computers and the programs they run to communicate directly. There are many small-scale, controlled-access "enterprise Internets," but the term is usually applied to the global, publicly accessible network, called simply the Internet or Net. By the end of 2002, more than 100,000 networks and around 120 million users were connected via the Internet. According to Encarta Encyclopedia (2003), Internet connection is usually accomplished using international standards collectively called Transmission Control Protocol/Internet Protocol (TCP/IP), which are issued by an organization called the Internet Engineering Task Force, combined with a network registration process and with the aid of public providers of Internet access services, known as Internet service providers (ISPs). This global communications network consisting of thousands of networks typically interconnected by fiber-optic ca-

bling had two parent networks whose joining began the ongoing evolution.

- U.S. Military (tactical communication in the event of telephone downtime during wartime)
- Academics (shared information between researchers).

**Poverty:** Poverty is an economic condition in which people lack sufficient income to obtain certain minimal levels of health services, food, housing, clothing and education, generally recognized as necessary to ensure an adequate standard of living. What is considered adequate, however, depends on the average standard of living in a particular society. Poverty could be relative or absolute. Relative poverty is that experienced by those whose income falls considerably below the average for their particular society. Absolute poverty is that experienced by those who do not have enough food to remain healthy. However, estimating poverty on an income basis may not measure essential elements that also contribute to a healthy life. People without access to education or health services should be considered poor even if they have adequate food (Encarta, 2003).

# Information in Electronic Government

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## INTRODUCTION

Information and communications technology (ICT) is radically changing productive processes in both the private and public sectors. Institutions that are more efficient eliminate production diseconomies and enable a more functional market. Specifically, institutions can multiply the incentives for human capital accumulation both by reducing the endogenous uncertainty in social-economic relations and by providing additional input to human capital generation itself (think of schools, universities, and research institutes).

Mainstream economic thinking generally accepts the argument according to which the transaction and information costs that are inherent to policy-making are largely greater than those incurred by the private sector (Dixit, 1996). If this is true, then public sector intervention is denied the possibility of achieving more efficient results than those obtained by the private sector (Holstrom & Milgrom,1991). Yet, ICT is radically transforming the way government entities perform their activities, which makes a timely debate on public sector information, in all its forms, all the more crucial.

Public administrations are following the example of the private sector by harnessing the efficiency-boosting potential of these new technologies. This development goes under the name of "electronic government" (e-government) and it encompasses both the internal and external applications of ICT in the public sector.

The importance of this development is increasingly evident in many countries of the world. Experiments are underway in Europe, at all levels of public administration (local, regional, national, and supranational), to improve the efficiency of public services and to increase interactions with the external world. ICT not only facilitates the inner workings of administrative machinery, it also eases communication between different branches of the administration and its interaction with citizens and businesses. This latter aspect is one of the main advantages of e-government, as it brings public sector entities, businesses, and citizens closer together, as well as improving the standard of public services.

In September 2003, the European Commission issued a Communication on "The Role of E-government for Europe's Future": it stated that e-government "is an enabler to realise a better and more efficient public administration. It improves the development and implementation of public policies and helps the public sector to cope with the conflicting demands of delivering more and better services with fewer resources" (p. 7).

## BACKGROUND

In order to understand just how complex the impact of ICT on public sector information actually is, it may be useful to start with a clear definition of the scope of e-government.

E-government is defined in the literature as "the process of transforming public administration's internal and external relations through network-based activities, information and communications technologies, in order to: (1) optimize service delivery, (2) increase citizen and business participation, and (3) enhance government capability" (Di Maio, 2001). This is probably the most comprehensive of all of the different formulations suggested so far to mark out the contours of this process, in that it identifies two macro areas—increased internal efficiency in the public administration and improvement of external relations with all parts of society—in addition to setting the medium-to-long term objectives. The implementation of these strategies is part of a broader process of re-definition of the administrator-citizen relationship, in an effort to respond to the need for change in the mechanisms of participation in the democratic life of a nation and also to boost efficiency—in terms of quality and cost—of the public services delivered to the community and to business, enabling the largest possible number of individuals and businesses to enjoy the advantages of the emerging Information Society (Aichholzer & Schmutzer, 2000).

Many of the definitions advanced at an international level go much in the same direction. European Commission (2003) defines e-government as "the use of information and communication technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies"(p. 7). EPAN (2004) and IDABC (2005) identify seven types of interconnected benefits: (1) improved quality of infor-

mation and information supply; (2) reduction of process time; (3) reduction of administrative burdens; (4) cost reduction; (5) improved service level; (6) increased efficiency; (7) increased customer satisfaction.

All definitions imply a rather broad vision of e-government, which is perceived not only as an evolution of the activities linked to the public sector, but also as part of a more generalized transformation of the State, through a deep re-examination of democratic practices and processes. For instance, in Zulfiqar et al. (2001) e-government is portrayed as a process that entails a complex and dynamic transformation of the entire state apparatus, at all levels, with ICT being used to involve citizens (C), businesses (B), administrations and governments—including foreign—(G), and public employees (E). These four categories represent the so-called "constituency"—the beneficiaries—of e-government strategies: in practice, it covers civil society and its democratic apparatus as a whole.

In a knowledge-based approach, a successful e-government plan hinges on the full-fledged participation of all of the categories of stakeholders in the process. The combined contribution of all of these agents is the only way to achieve the "dissemination of information and knowledge" which—together with a profound re-thinking of relations between social "communities"—may not only bring about a powerful infrastructural and conceptual evolution of the administrative apparatus, but also modify the way individual rights and duties are exercised (Lenk & Traunmuller, 2000).

The use of ICT in the implementation process of e-government closely reflects the two macro areas mentioned above. On the one hand, these new technologies contribute to an improvement of the internal efficiency of public administrations, by streamlining information and administrative process management—which will have an impact on relations between administrative apparatuses at both a horizontal level (between agencies, departments and ministries) and a vertical one (between central and local agencies). On the other hand, ICT enables better management of external relations—with the constituency—ensuring higher standards of service and information delivery to the public, as well as—at least potentially—enabling levels of democratic participation that were previously unimaginable (Caldow, 2001). Understandably, ambitious objectives such as the above require not only broad-based support, but also the implementation of a series of preliminary steps, including the following (Aichholzer & Schmutzer, 2000):

- Policies to facilitate access to information and public services (tax policies for the spread of screen-based technology, education and training policies, infrastructure endowment, services planned in a multi-media approach, so as to minimize the exclusion of potential users in a given country (digital divide)
- The reorganization of the internal structure of public administrations in a user-centered approach, more than based on an "administrative" allocation of competence

Figure 1 identifies 4 stages in the implementation of e-government, each of which might be broken down, in turn, on the basis of policies; measures concerning employees; processes underway; and the adoption of technologies including: (a) presence of the public administration on the web, (b) interaction with the public, (c) development of transactional services (enabling the full-fledged implementation of self-service applications, as well as the use of the web as a tool that is complementary to other communications channels), (d) complete transformation of the public administration's modes of interaction with its branches and with the citizens.

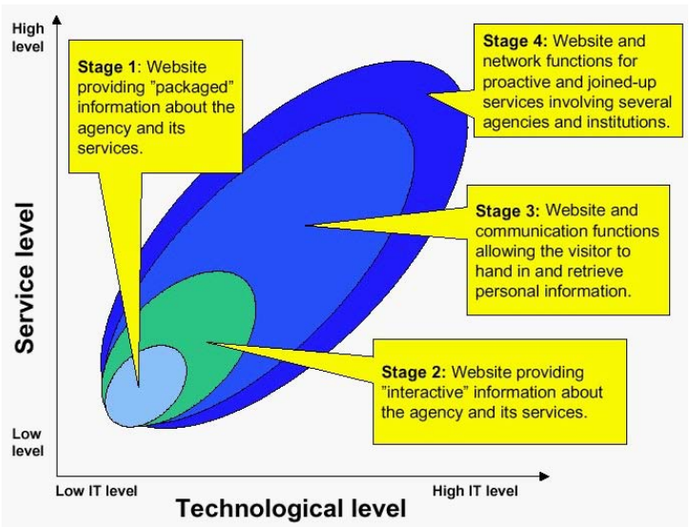
In a context in which e-government is fully implemented, public sector information management extends well beyond the straightforward supply of services to the public. It becomes the nerve center of all relations in the newborn Information Society. However, the somewhat embryonic state of the current "frontiers" of e-government appears (at least in Europe) to call for the need to kickstart the major shift forward that—alone—can transform e-government from a simple improvement in relations between public administrations and citizens to a new paradigm of government and growth in the future Information Society.

## SUPPLY AND DEMAND OF PUBLIC SECTOR INFORMATION

The expression *public sector information* is used to describe the depository of documentation that is produced, collected, and, to a degree, disseminated by the public administration. It does not cover the documentation regarding the public sector that is produced by the private sector.

This concise definition hides a far more complex classification. The wealth of public sector information and documentation may be categorized on the basis of distinctive and, partly, overlapping criteria, such as: type of entity generating the information; legal norms regulating its production and dissemination; different users and addresses; agents processing and managing the documentation; material and formal characteristics of information, etc.

*Figure 1. The four stages of e-government (Source: Swedish Agency for Administrative Development (2000), The 24/7 Agency–Criteria for 24/7 Agencies in the Networked Public Administration http://www.statskontoret.se/upload/Publikationer/2000/200041.pdf)*




Consider, for instance, the following:

- Legal documentation (laws, regulations, rulings, and general administrative provisions; at all levels of the administration: central, regional, and local)
- Statistical information
- Institutional communication
- Archival documentation (stored in current and historical archives)
- Scientific information (environmental, health care, etc.)
- Parliamentary documentation
- Official cartography

Each of the categories in the non-comprehensive list above comes under different legal schemes (relating, for instance, to consultability and access), and requires different processing methodologies, storage facilities, and user or recipient requirements.

The terms *public sector information* and *documentation from public sources* are used here as synonyms, though the term *documentation* (documents and data) is more precise, as it points directly to the link with digital media, whereas *information* is a more generic term, and may also cover oral communication. The availability of public documentation and the requirements of users have influenced each other mutually and changed in time.

The discovery of the Internet by public administrations, with its potential ease-of-use, has rapidly amplified both demand on the part of the various user categories, and the supply, not only of information, but also of services.

Technological innovation, the widespread demand for good governance, the emergence of general information and access-related rights, pertaining to information and access, and the evolution in administration-citizen relations are only some of the factors that have helped do away with many of the barriers to the consultation of documents by the general public.

For example, in Italy, in the early 1990s, Law 241 established the right of access to administrative documentation on the basis of an interest that needed to be demonstrated. Legislative decree No. 39, which was adopted on Feb. 24, 1997, transposing Community Directive No. 13 (June 7, 1990), provided that public authorities are under the obligation of making environmental information available to "anyone advancing the request for such information, without any need for a specific interest to be demonstrated."

This has led, on the one hand, to a shift from document accessibility to document consultability, and, on the other hand, to a shrinking of the domain of confidential documentation and an expansion of the documentation that is accessible to a non-differentiated public.

The trend allowing public access to administrative documentation, which has made considerable headway in all western countries, flows from an awareness of the fact that democracy as a principle is deeply influenced by

the way information circulates in a given society and by its availability to citizens. It can be argued that a good yardstick for assessing the degree of democracy in a system is the quantity and quality of information that circulates within the system and the number of potential users having access to it.

In Italy, the only relevant legislation on the dissemination of information by the public sector is Law No. 150 (June 7, 2000). For the first time in the Italian legal system, this provision specifically stated the objectives of public communication, namely to:

- Illustrate and promote knowledge of legislative provisions, to facilitate their implementation
- Illustrate the activities of institutions and the way they work
- Facilitate access to public services by making them more widely known
- Promote extensive and in-depth knowledge of relevant public and social issues
- Foster internal processes to simplify procedures and modernize institutions, and provide information on administrative procedures, their initiation and development
- Promote the image of the administrations, and the image of Italy, in Europe and throughout the world, by disseminating information and lending visibility to local, regional, national and international events

However, this legislation does not place any obligations on the various levels of administration with respect to the dissemination of information.

## CITIZEN'S RIGHTS

"La libre communication des pensées et des opinions est un des droits les plus précieux de l'homme, tout citoyen peut donc parler, écrire, imprimer librement, sauf à répondre de l'abus de cette liberté dans les cas déterminés par la loi": the spirit and the tone of Article 11 of the 1789 *Déclaration des droits de l'homme et du citoyen* readily shows that the contentious issue immediately at stake, at that time, was censorship and the first freedom guaranteed to citizens was protection against this threat. Owing precisely to these roots, the right to information has been generally conceived as the right of information professionals and when it did refer to citizens at large, it was usually understood to mean freedom of opinion and expression, and is still treated as such in many contemporary texts of constitutional law.

With the 1948 Universal Declaration of Human Rights—Article 19 of which explicitly states the right to "seek, obtain, and disseminate information"—the right to information has become a constitutional right of every citizen. It is no longer confined to the however vast area of the mass media, but instead applies to the full range of activities of any individual.

In particular, establishing the right to "seek and obtain information" has modified the relationship between citizens and government. For one, governments' obligations are no longer circumscribed to censorship, according to the classical pattern of negative freedom. Governments must open up to the demands emanating from their citizens, and abandon the entrenched privileges of any administration, as evidenced by the fact that several countries over the last few years have adopted laws on the rights of citizens to access government-held documentation (European Commission, 1999).

Before the advent of Internet, a vertical form of communication based on the pattern of free-to-air television prevailed almost exclusively. This meant that the recipients of communication were understood to be passive, much like readers, albeit of images rather than words; and it reproduced and perpetuated the distinction between producers and consumers of information, and the need for a category of mediators who would lend material substance to the notion of citizens' access to information. This was basically the case even in those situations in which laws were in effect granting access to information to all citizens, as in the late 18$^{th}$ century Sweden, where public documentation was, by way of principle, accessible to all citizens. However, since the exercise of this right meant that the individual had to travel to wherever the documentation was stored, journalists—who would obtain the information, make their selection, and convey it to public opinion—mainly used it. In practice, a mediator filtered the right of everyman.

Today, citizens can use networks and engage in horizontal modes of communication, which has substantially modified their position, doing away with dominant positions, pre-established agendas, or restricted speaking times. Once this new mode of access is recognized, with its manifold implications, all citizens are, in principle, on an equal footing, and they can all become agents of communication. This has undeniable democratic implications. Individual citizens are no longer simply information-retrievers: they are also information-suppliers, thereby breaking down the power that was exercised until only recently by a restricted group of professional mediators who selected the information to be circulated. The degree of democracy of a system is determined *inter alia* by the extent to which citizens may actually perform this new role.

The most significant innovation must surely be the elimination of the barrier that separates information sup-

pliers from information consumers. A new "communicating subject" has emerged, and this means that the issues at stake now extend well beyond the growing individualization of information and communication.

## CONCLUSION

The expanding potential of individuals as "communicating subjects" results directly in a change in the social quality of information. With all individuals acting as both producers and consumers of information, even the most marginal Internet user enjoyed a "power of speech" that may match that of governments or powerful corporations, if the information that is introduced to the network by that user is just the sort that the others would have done anything to suppress. Censorship, in all its dimensions, becomes much more difficult to apply, as those totalitarian regimes that are attempting to curb the penetration of the Internet know very well.

Nevertheless, this is not the only difficulty. A formally free environment is not enough, as the network can express its full potential only on condition that access to both the information supply and information search phases is truly free in material terms. In addition, this, in turn, requires a basic set of conditions, ranging from mass (computer) literacy to the availability of real "universal service" (in terms of geographical coverage, compatible telephone rate policies...).

The situation is hugely complicated today because: (1) it is no longer under the complete control of the traditional established powers, the nation states; (2) powerful entities, especially in industry, have the ambition to governing the world of information and communications technologies; and, (3) the network rhetoric means having to measure up to the hyperbole of every inhabitant of the planet being considered an agent of communication processes.

Basic values should be identified. For instance, what does equality mean in this context? Not to be content with consoling, albeit Utopian visions, means tackling more than the issues mentioned above: mass computer literacy and universal service. Another crucial issue is that of surfing tools, browsers and search engines, which should not be rudimental for some and rich versions for others, but should be research-enabling and not merely information filters (with the selection criteria set by others).

This is where public policies take center-stage: can the planning and development of the new nervous system of society be left to industry and the marketplace alone? Alternatively, is there instead a need for social demand, captured and interpreted by institutions, to orient supply so that it does not have bringing the products that guarantee maximum profits into the market as its only polar star?

Therefore, in the newest of worlds, the time-old question rises once again: State or Market? Of course, these two terms are not necessarily at loggerheads. But they may very well be so, if the (rarely disinterested) illusion that the two terms may be reconciled without enlightened policy-making is entertained.

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## KEY TERMS

**Digital Divide:** Inequalities in access to ICT, computing skills, and electronic information content among inviduals, households, and communities within a country and among countries.

**Documentation from Public Sources:** Synonym for *public sector information. Documentation* (documents and data) is more precise, as it points directly to the link with digital media.

**Electronic Information:** Any sign, signals, writing, images, sounds, data, or intelligence of any kind store in whole or in part in electronic form.

**Electronic Government:** The process of transforming public administration's internal and external relations through network-based activities, Information, and communications technologies, in order to: (1) optimize service delivery, (2) increase citizen and business participation, and (3) enhance government capability.

**Electronic Government Constituency:** Citizens (C), businesses (B), administrations and governments—including foreign—(G) and public employees (E). In practice, it covers civil society and its democratic apparatus as a whole.

**Public Administration:** Government or other public entity, including public advisory bodies, at national, regional, or local level.

**Public Sector Information:** Depository of documentation that is produced, collected and, to a degree, disseminated by the public administration. It does not cover the documentation regarding the public sector that is produced by the private sector.

# Information Management in Kutch Earthquake

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## INTRODUCTION

The term digital governance refers to governance processes in which information and communication technologies (ICT) play a significant role. Digital governance uses ICT to induce changes in the delivery and standards of governance services and, more importantly, in the way citizens interact and participate in the governance sphere. The role played by ICT could be wide ranging: in delivery and standards of governance services, to how people access such services, and the participation of people in the governance sphere (Digital governance.org Initiative, n.d.).

Digital governance is not just another facet of governance or one more interface between citizens and government. Digital governance is a whole new opportunity, creating immense possibilities between citizens and government by redefining vision and the scope of the entire gamut of relationships (Bedi, Singh, & Srivastava, 2001). Two fundamental anchors of digital governance are local knowledge communities and citizen-centric governance.

## BACKGROUND

In 2001, an earthquake measuring 6.9 to 7.9 on the Richter scale struck the district of Kutch in the state of Gujarat, India. The day was January 26, celebrated as Republic Day in India. Damage to life and property was immense. The rescue, relief and rehabilitation work that followed heavily depended on information of various categories and at various levels of functioning. This is the story of transformation of a situation of crisis into a window of opportunity. The article is a development from the oral history recorded from individuals who were associated with the rescue relief and rehabilitation work in Kutch (Mukherjee, 2002). The author was one of the consultants for this project.

## ROLE OF INFORMATION

The importance of this information management came through right from the day of the earthquake. Numerous agencies came to work to provide succour; relief material came in truckloads. Coordination was needed urgently. Many times there would be mismatch of items. For example, a truckload of tea was available but there was no sugar. It was important to put into balance what was required and what was available. The need was felt for a composite demand chart. This was the beginning of collecting and collating information that ultimately resulted in creation of Setus, or bridges; that is, centers that not only catered to the information required for carrying out relief operations, but developed into nodes that would supply data to the government and CSOs about the ground-level requirements and inform the beneficiaries at the personal level of what was available. Later, the Setus coordinated the information required for developmental work so that the devastated region could become productive again.

The idea, according to a United Nations Development Program (UNDP) report (2001), was almost classical in its simplicity—a network of village-level centers that provide a trickle-up flow of data, feedback and information to influence policy and programs. A Setu was conceived as a nodal link between all the actors in relief and rehabilitation. Its stakeholders were government agencies and officials at different levels, CSOs, the donor community, the village community and the Setus themselves. Primarily intended to bridge the gap between the efforts and outcomes of the rehabilitation process, the Setus ultimately aimed to make people less vulnerable in a multi-hazard environment by harnessing local resources to optimal levels. To do this, the Setus had a wide-ranging set of activities. They facilitated coordination between government agencies and CSOs on the one hand and the village community on the other, to ensure a proper flow of benefits. They served as platforms for redress of grievances and transparency of procedures. All this was to be made possible through a two-way information flow.

### Information for Relief

By January 30, 2001, 33 sub centers, which later were renamed Setus, were established across Kutch for distribution of relief material. The main depot was in Bhuj. The decision was that volunteers would not go around in trucks distributing relief material. Instead, there would be few volunteers in each of the sub centers. These volunteers would set up "relief material distribution commit-

tees," establish the needs of the local people and then approach the depot with a consolidated list of requirements. This would affect people's participation as well as prevent wastage, as only the relief material whose need had been established would be distributed. The distribution at the local level would be through a committee. This arrangement went on for about 2 months.

Responses to large disaster events are likely to involve a large number of relief agencies and teams that create severe pressure on requirements for interoperability and cooperation. With numerous agencies wanting to help Kutch, coordination became essential. The CSOs and corporate houses did not know where to work, how to work. Some corporate houses did not know how to deal with local people or community. These agencies sometimes had special focus such as health, housing and so forth. Also, Kutch being a large district, had long distances to cover. Therefore, information and coordination was essential with relief distribution.

## Information for Rehabilitation

In the rehabilitation work, Setus influenced the decision of government by producing concrete data. Initially, the government had decided that villages more than 70% damaged would be relocated. Government had announced this policy. However, it was known that Kutch has a drinking water problem. Also, the agricultural land of the villagers would be disturbed, and people may not accept it.

The 33 Setus, within 48 hours, developed a program for facilitating village community, including village *gram panchayats* on relocation, explaining what relocation was, whether it would be acceptable to them, reasons for their opinions. It was a facilitation program for the village to take a decision about acceptance or rejection of relocation. Only 2%-3% of the villages were agreeable to relocation. The remaining wanted *in situ* reconstruction and rehabilitation. This opinion, with enough scientific and technical data, was provided to district government and state government.

This made government change its policy. The decision was made for *in situ* development. The government was also very happy, as this prevented a crisis. This made government decide to make Setus become an official body for reconstruction and rehabilitation of Kutch. A government resolution (GR) to the effect that the Setus are the earthquake rehabilitation support centers was released.

## Collaborating with Government Rehabilitation Programs

These support centers also took up the job of damage assessment, damage to shelter, damage to water structures—dams, wells—damage to hospitals, assessment of injuries of people. The assessments were to help determine the extent of damage and the commensurate assistance to be disbursed by the government.

The first survey in the rehabilitation phase was to determine whether people were getting their installments of assistance from the government. The installments were released when certain phases of construction was completed; for example, the first installment to build up to plinth level, the second installment after seismic safety features were incorporated, and so forth. Overall, the picture was that there was incongruence between government data and information available on the ground. In Bhachau Taluka, one of the worst affected areas, the government said that 70% disbursement had been done, whereas the actual figure of receipt was found to be 30%-40%.

Then it was realized that the government had disbursed the checks, but the problem was with local banks, which were not able to operate properly due to lack of staff and inadequate cash reserves, especially the village branches. Therefore, money transaction had hit a bottleneck.

At the village level, the community was also not very used to banking transactions. Without cash, construction work could not commence or continue. This information was conveyed to the collector, who immediately called all the banks and the chairmen of the banks and sorted out the situation.

## Information and Transparency

The Setus collected household data for the 360-370 villages, including the hamlets. This included category of damage; whether repair or reconstruction was required; if construction was necessary, was any CSO involved; if so, name of the CSO; the level of construction; and seismic safety measures.

The other utility of the survey was identifying spurious claims. For example, two brothers applied for assistance for the same house they had been occupying before the earthquake. Setus determined the number of houses that existed before the earthquake and the number of houses for which compensation was being given after the earthquake. After this, a flying visit would be made by a government surveyor.

In the beginning, this caused problems, as the community felt that though the Setus were primarily for the community, they were actually working against the community. This is where the importance of Setus vis a vis government machinery became evident. Since the Setu office bearers worked with the community, they could explain that because of a few people the village was

getting a bad name in the whole region. The people who had claimed their legitimate share realized that because of such occurrences, if their village gets a bad name, the government may actually withhold disbursement of compensation. Thus, a major crisis could be diffused.

### Government Policies and Feedback

Simultaneously, the government was forming policies that had to be understood by the villagers, and it needed feedback for smoother implementation. For example, the government had said that the second installment for construction of homes would be given after finishing the first installment's work, and that construction must be seismic safe. However, people did not understand what seismic safety meant. So such information had to be disseminated and awareness developed. Therefore, information collection and dissemination for coordination, policy advocacy with grievance redress and awareness building were major activities at this stage of rehabilitation.

However, Setus have not always been successful in policy advocacy. For example, the government had decided that for construction of temporary shelters, galvanized sheets and three bags of cement were to be distributed to each affected villager. Setus pointed out that Kutch was a cyclone-prone area, and the tin sheets could fly off during a cyclone and become a major hazard. Also, it is very hot in summer, sometimes reaching 48 to 50 degrees centigrade in the Rann area. In this situation, people could not live under tin sheets. However, the government still distributed the sheets.

## Information for Development

Availability of information that is reliable was a strongly felt need. Information was floating all around – with the government and the CSOs. Ordinarily, each CSO would carry out its own survey, and the data would remain with them, unavailable to others. Later, another CSO might have carried out a similar survey, unaware of the existing report. Such surveys cost time and money. In addition, the villagers did not get control of their own information. Hence, the communities do not become empowered to actively participate in decisions for development. This, according to Harris (1996), tends to stimulate social exclusion by failing to include local communities.

### Information for Empowerment

As the rehabilitation work came to an end, it was decided that work should continue for development. Among other activities, a databank needed to be organized, as information is power. Each agency trying to do any developmental work has to collect information from a government office, running from one table to another and spending 15 days doing so. This process has to be repeated by any other agency wanting the same data. Finding collated and accurate information at one place is well neigh impossible. Therefore, it was decided to set up a data/information bank. With a comprehensive database, every organization could immediately get the required information.

### Development of Databank

The critical importance of information flow in real time between the government, CSOs and the community underscored the need to electronically connect the central coordination cell in Bhuj with each Setu to enable speedy transfer of the voluminous data being handled by the district administration. With UNDP support (through USAID), the Kutch Rehabilitation Information Center (KRIC) was set up for the collection, processing and dissemination of information. KRIC developed rehabilitation information management system (RIMS) software to analyze village-level data generated by the Setus on progress in the shelter, health, schools and livelihoods sectors (United Nations Development Program, 2001).

A software company became a partner in the creation of the databank. Personnel from the software company and Setu jointly drew up the User Requirement Specifications (URS). The software professionals were entrusted with the job of structuring the data as per the URS, screen design and user interface, information retrieval tools and techniques, and so forth. Setu personnel started working on the questionnaires that would go out in the field, where the data gets collected. A snapshot of the village was to be constructed from the questionnaire. Information to be collected was extensive and diverse, such as whether there was a primary health center or who was the *Sarpanch* (village head) and the cast he belonged to. Occupation of the people was a major component of the database, especially whether there were handicraft artisans and their profiles of skills.

One section of the databank would provide information to donor agencies about requirement of schools, the number of paraplegics requiring help and so forth.

The other section of the databank contained government information, such as various government schemes, bank loan facilities, eligibility for applying for schemes or loans, methods for applying and so forth. The government was keen in providing information about schemes, as this would reduce the number of useless applications. This section was to help the community avoid schemes.

Government information is scattered across diverse departments. Also, different facilities are taken care of by various government levels. For example, within a state,

national highways are central government responsibility; other roads are state government responsibility but, at the district level, Zilla Parishad (or district administration) is responsible, whereas village roads are the responsibility of local government (or *Panchayat*). Therefore, comprehensive data on roads is not available anywhere, even if each individual department has its own set of data well organized. This databank would cut across departments and organizational structures to collate data from the user's point of view.

## Data Collation

Data was collated under 10 sectors, such as shelter, livelihood, health and education. Within each sector, the data was beneficiary-wise. Therefore, if any government policy was made, or a CSO intervention had to be organized, the focus could be on the actual number of beneficiaries, names of beneficiaries, their income and type of intervention required.

For vulnerable sections (widows, handicapped, paraplegics, orphans), where there were organizations and the government had very specific programs, data was organized by individuals' names. It was possible to know if a certain widow was getting her pension, the amount and so forth.

This primary data collected was to be used to complement and support the secondary sources, such as census data. The Setus are to supply both government-generated data where it is available and enrich it with local micro-level data. .

## Data Updating Frequency

The next requirement was to set the parameters for updating frequency. Some data was to be collected every 3 months, some once a year. The basic population and caste statistics—their residence and so forth—would be updated once a year, whereas data about the number of children attending a school, the number of days the teacher was present and so forth was to be collected every month to provide a status report to the government about the state of the schools.

## Report Generation

Special reports were also to be generated as required. For example, OXFAM had taken up work in two villages of laying pipelines that had been damaged by the earthquake. It required information on water availability and usage in that area, especially the social dynamics, such as whether the Rajputs and Harijans get an equal amount of water and so forth. The local Setu coordinator compiled an in-depth study of that locality on ownership of water and its usage, such as the total number of wells, the number of wells belonging to the different castes (such as Darbar, Koli), if there was a pond, whether the water was clean for washing clothes, were Harijan women allowed to use the pond and so on. This report ensured that the OXFAM project would take care of equitable distribution for the entire community and not get skewed. This type of in-depth report was possible because the Setus were part of the community; the Setu members were constantly interacting with village inhabitants.

## Village Gazette

Once the databank was developed, the next step was to develop a village gazette for every village of Kutch. The village gazette is to cover the history of the village, its socio-economic aspects, human resources and natural resources (like different species of vegetation, water, boundaries and so forth). A satellite map would also be provided for natural resources. There would be household survey data for every house and the physical plan of the village. The village gazette would become the one-stop information shop for anyone wanting to work in that area. By data aggregation of the villages, a regional planning tool, a data tool for policy advocacy, would be created.

## Problems of Connectivity

While essential hardware such as Dell servers and database software are available, the Setu centers have their own computers from where data is uploaded on the server through a dial-up facility. The problem remains with connectivity. Telephone is present only in a few places. The Setus that do not have telephonic connectivity yet send their data on floppies/CDs.

The state government has offered the connectivity through the Gujarat State Wide Area Network (GSWAN)—that is, a 2 mbps line to the districts and a 64 kbps line to the talukas. So far, the government has been using the network for teleconferencing and videoconferencing.

## Problem of Sustainability

The development of the database and regular updating requires funds. After the initial funding is over, resources have to be generated to continue the program. It has been envisaged that the users, whether individuals or organizations, will pay for the information, as they will not have to waste time and money for data gathering to commence their work.

## FUTURE TRENDS

After this experience in Kutch, during mid-term evaluation World Bank has recommended the government of Gujarat start Setus in non-Kutch areas. Gujarat government has funded CSOs to start these types of Setus in non-Kutch areas of Patan, Surendranagar, Rajkot and Jamnagar. When Tazakistan had an earthquake, it was eager to emulate Kutch's program. Setus have made empowerment through information for the people, of the people and by the people, possible.

The adoption and use of ICT has led to better community support and development, as explained by Taylor (2004). The civic empowerment through information and knowledge management has made the local community more demanding, a necessity in good governance. This, therefore, will lead to a more proactive government. The work of the Setus has been instrumental in raising awareness among the local citizens regarding the empowering nature of information, use of technology for better access to information and use of information as a potent weapon to fight bureaucratic obfuscation.

The future is in tapping into the cumulative information/knowledge facilitated by digital technology, building on processes and systems already in place and enhancing the role of the local communities in government decision-making.

## CONCLUSION

With advancement in ICT in the form of the Internet, GIS, remote sensing and satellite-based communication links, it is very much possible to plan and implement disaster risk-reducing measures. These technologies have been playing a major role in designing early warning systems, catalyzing the process of preparedness, response and mitigation. ICT tools are also being widely used to build knowledge warehouses using the Internet and data warehousing techniques. These knowledge warehouses can facilitate planning and policy decisions for preparedness, response, recovery and mitigation at all levels (Asia Pacific Telecommunity-International Telecommunication Union, 2005).

To reduce the risk and vulnerabilities in India, the Ministry of Home Affairs, being the Nodal Ministry for disaster management, is taking the lead on disaster management and mitigation in the country. The Ministry has drawn up a National Disaster Management Framework for India. This national framework covers prime sectors, such as institutional mechanisms at all administrative levels and disaster mitigation/prevention to be mainstreamed into the development process (Mohanty, Karelia, & Issar, 2005).

This is a top-down approach of the government at the macro level. The experiences of the Kutch earthquake has established that it is not the technical, but rather the social and cultural, aspects of digital revolution that provide the transforming force. Participation of community members, groups, and organizations is imperative for overcoming crisis. A shared value base between community and policy makers is crucial to the formulation of policies that build, develop and sustain communities (Day, 2004).

In fact, Mathen (2001), writing within 2 months of the earthquake, felt that the process of rehabilitation would not require experts except at the mapping and information-generation stage. Once that was done and shared with people, then their accumulated knowledge, collective wisdom and adaptive skills would work out the "best practices."

Knowledge and recognition of this set of knowledge by the decision makers and people alike are the pillars on which good governance rests. Digitization of this knowledge within a network, open to all individuals, opens possibilities for everyone to access and use this knowledge—paving the way for digital governance (or e-governance). Introduction of digital governance ensures that citizens can participate in and influence decision-making processes that affect them closely. Citizens no longer remain passive recipients of governance services provided to them, but can proactively decide the types and standards of governance services they want and the governance structures that can best deliver them.

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## KEY TERMS

**Data Collation:** Data is documented information or evidence of any kind. In library and information science and computer science, collation is the assembly of written information into a standard order.

**Earthquake:** Shaking and vibration at the surface of the earth resulting from underground movement along a fault plane of from volcanic activity

**Information Management:** The administration of information, its uses and transmission, and the application of theories and techniques of information science to create, modify, or improve information handling systems.

**Rehabilitation:** The processes of helping a person achieve the highest level of function, independence, and quality of life possible. From the Latin "habilitas," which means to make able.

# Information Security Issues and Challenges

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## INTRODUCTION

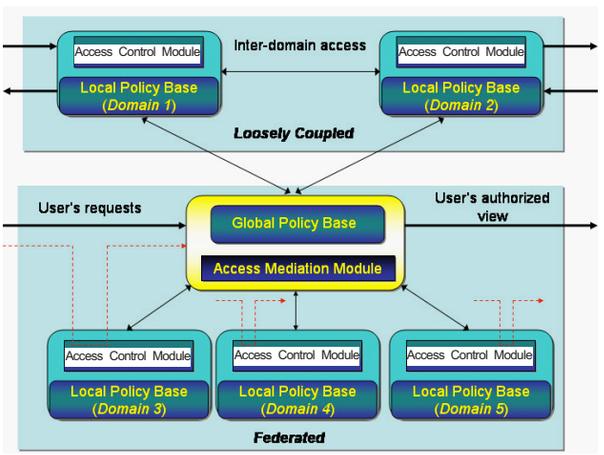
An electronic government (e-government) can be viewed as a large distributed information system consisting of interconnected heterogeneous subsystems through which government agencies, citizens, and public and private sectors interact to facilitate exchange and sharing of huge volumes of information. Such large scale information sharing and interoperation are geared towards streamlining decision-making processes through an efficient flow of information and execution of government's transactions to facilitate easy access to improved services. Key scenarios of system interactions in an e-government include: government to citizen/employee (G2C/E), government to business (G2B), and government to government (G2G), (OMB, 2004). G2C (or G2E) activities cover the interactions and information exchange between government agencies and citizens (or its employees), for instance, while filing government taxes. G2B refers to activities related to interactions between government and public and private sectors, for instance, when a government agency engages in a supplier-consumer or a buyer-seller relationship with a public/private sector business. G2G refers to activities involving interactions between two government entities. An interaction between a state office and a related federal office is an example of a G2G interaction. A critical issue related to these interactions is the need to integrate system components under disparate administrative domains with distinct policies and mechanisms. Crucial goals of an e-government infrastructure also include increasing *internal efficiency and effectiveness* (IEE) and streamlining *common lines of business* (CLoB) (OMB, 2004). For instance, if each of the federal agencies has its own payroll system, the IEE activities may involve consolidating the payroll function of multiple agencies into one system. This makes the payroll function a logical part of different agencies, thus, processing different sets of payroll information, under possibly different security policies. Similarly, if the agencies have CLoBs, the e-government infrastructure would need to remove unwarranted redundancy in service components and information processing activities.

Although emerging IT solutions provide intriguing opportunities for supporting the design and implementation of an e-government infrastructure, use of these technologies, the highly sensitive nature of information it maintains, critical transactions it processes, and the national security issues the government processes bring forth, create significant infrastructure security challenge (GAO, 2004; Joshi, et al., 2001b). The recent GAO report indicates that while interconnectivity of heterogeneous domains is a basic need for an efficient e-government system, it significantly raises the potential for unauthorized access to personal and confidential data and exposes the critical infrastructures to new vulnerabilities (GAO, 2004). A significant challenge is thus, to provide an integrated e-government infrastructure that ensures secure integration of services and information sources, fosters security assured partnerships among public and private sectors, and securely manage government resources.

## INFORMATION SYSTEMS SECURITY

Various goals of information systems security include *confidentiality*, *integrity*, *availability*, *accountability*, and *assurance* (Joshi, Aref, Ghafoor, & Spafford, 2001a). Primary mechanisms that provide the foundation for the security of information systems and infrastructures include *authentication, access control,* and *audit*. Authentication establishes the identity of an entity and is a prerequisite for access control. Access control limits the actions or operations that a legitimate entity performs. The audit process collects data about the system's activity. Once a user is authenticated, the system should enforce access control using an established technique such as a reference monitor that mediates each access by

*Figure 1. Example multidomain environment*




a user to an object. Several access-control models have been proposed to address the security needs of information systems. Traditional access control approaches fall into two broad categories: *discretionary* (DAC) and *mandatory* (MAC). DAC approach lets users grant their privileges to other users, whereas MAC approach uses a classification scheme for subjects and objects. User classification leads to several clearance levels for access control, whereas classification of objects can be established according to their sensitivity. To avoid the unauthorized flow of sensitive information, the MAC model—often known as the *multilevel model*—can enforce *no read-up* and *no write-down* rules with respect to the security levels (Joshi, et al., 2001a).

Several security technologies that are becoming indispensable for large distributed and networked heterogeneous systems, like an e-government, include *firewalls, intrusion detection systems, encryption techniques, public key infrastructure (PKI) technologies,* and *trust management techniques*. For an e-government infrastructure, designing and implementing various security mechanisms in an integrated manner poses a daunting challenge.

## SECURE INTEGRATION IN E-GOVERMENT SYSTEMS

An e-government system is essentially a multi-domain environment containing a number of independent security domains employing their own security policies, mechanisms, data models, and different architectures and computing platforms. A multidomain environment can be characterized as either *loosely coupled* or *tightly coupled* (Joshi, Bhatti, Bertino, & Ghafoor, 2004). Figure 1 depicts the two forms of multidomain interactions from an access control perspective. In a *loosely coupled* environment (e.g., domains 1 and 2), systems dynamically form transient partnerships. On the other hand, in a *tightly coupled* or federated multidomain environment (e.g., domains 3, 4, and 5), the domains form more or less a permanent partnership and their security policies are integrated to form a mediation layer or a metapolicy that mediates all accesses. Typically, a complex multi-domain environment, such as that formed by all the five domains in Figure 1, may contain several component multidomain environments that are either *loosely coupled* or *tightly coupled.* For instance, given a particular state in the USA, all state agencies can be either federated or loosely coupled with each other, depending on requirements. A *State Office* may be loosely coupled with the *Land Records Office*, but the *Land Records Office* maybe federated with the *City Electricity* department. But the components of the e-government associated with two different states may actually be acting as two loosely coupled domains. For instance, if the *Police department of Pittsburgh* wants to interact with the *Police department of New York City*, then the interaction could actually be between two independent multidomain components associated with *Pennsylvania* and *New York*, respectively.

Achieving secure integration in such a heterogeneous environment is a multifaceted problem. The key challenges include: *semantic heterogeneity, secure interoperation, risk propagation and assurance,* and *security management* (Joshi, Ghafoor, Aref, & Spafford, 2001b).

### Semantic Heterogeneity

Heterogeneity may exist in several forms (Hosmer, 1991). For example, it may be composed of diverse interacting constituent agencies with different policies, or the variations of the same set of security goals, and/or may have heterogeneous system components such as operating systems, databases, and so forth, each with different security goals and mechanisms. Integrating such heterogeneous systems within an e-government infrastructure requires powerful mechanisms to resolve semantic heterogeneity among the security attributes of the individual domains that span different layers and components. Policies can give rise to naming conflicts among similar security attributes, and structural conflicts among policy components such as user/role hierarchies and access rules.

## Secure Interoperation

*Secure interoperability* among partner domains in a multidomain environment is a crucial issue and can be achieved by enforcing the principles of autonomy and security (Gong & Qian, 1996): The *principle of autonomy* states that *if an action is permitted in an individual domain, then it should also be permitted during interoperation*; whereas, the *principle of security* states that *if an action is not permitted in an individual domain, then it should also not be permitted in interoperation*. It is possible that when two perfectly secure domains allow cross-domain interactions, the interoperation introduces security holes (Gong et al., 1996). For example, consider two systems $S_1$ and $S_2$, and assume that user *A* can access whatever user *B* can access in $S_1$, and user *C* can access whatever user *D* can access in $S_2$. Now, suppose we allow $S_1$ and $S_2$ to interoperate by allowing *D* to access *A*'s files and *B* to access *C*'s files. This results in the violation of the security principle, as B can now, because of transitivity, access *A*'s files, which was not permitted within $S_1$ alone. A crucial problem is related to the issue of the verification of the correctness of the integrated policies and the complexity issues related to it (Joshi et al., 2001b).

## Assurance and Risk Propagation

A multidomain environment is a single-point of failure system. In other words, if a single e-government component is compromised, the entire infrastructure could become vulnerable to attack. Hence, appropriate mechanisms need to be in place to ensure that system components are highly assured and that propagation of risks to unaffected systems from potentially compromised systems can be controlled in a timely fashion. Assurance indicates the confidence that the security goals are met by the enforcement mechanisms deployed (Joshi et al., 2001b). A related issue is the *cascading problem*. In general, information that e-government systems contain may use various security classifications in different domains. Consider two multilevel systems *X* and *Y* that classify information as *unclassified* and *secret*, and *secret* and *top secret*, respectively. When integrated, they will collectively process the information at the three levels and share them. If the two systems are individually compromised, that is, a malefactor can now downgrade *top secret* to *secret* in *Y* and *secret* to *unclassified* in *X*, then the *top secret* information can be easily made available as *unclassified* information in system *X*. Thus, in an e-government environment, each system should maintain a high level of assurance and be aware of the security assurances of the other systems. Determining the level of interconnectivity among e-government components based on risks that each poses is highly desirable but difficult to achieve because of the complexity of determining risk that each component may pose.

## Security Management

Security management is another significant challenge for an integrated e-government infrastructure because it contains a large number of administrative domains with huge pools of subjects, objects, and resources that need to be managed. In particular, these entities may not be known at policy design time. For example, a federal agency may not exactly know which types of users or private businesses it will be interacting with in the future. The entities that represent users, objects, policies, security domains, and other components may also be transient. This inherent dynamism makes the task of overall management and, in particular, security configuration management, and the management of metapolicies and policy evolution very difficult (Joshi et al., 2001b). Practical and efficient methodologies for security management will be crucial for the success an e-government. A challenge requiring significant national effort is that of creating efficient and effective nation wide plans for incidence handling, disaster recovery and business continuity.

A key technical problem in an organizational system is the insider attack that disgruntled employees can launch. In an e-government, this can pose a serious national security risk. Such a problem can exist because of inadequacy of systems to properly administer access policies and ensure their enforcement (Briney, 2000). Proper management of authorization policies, and policies related to the use of various software programs such as e-mails, browsers, and so forth and use of up-to-date virus protections can greatly reduce insider attacks that can often be considered accidental or unintentional. Such unintentional insider security breaches can largely be avoided through education and awareness, for instances, as advocated by the Human Firewall Council. Approaches using separation of duty and granting of least privilege to users can greatly reduce the misuse of resources by an insider.

The gravity of insider threat in an e-government environment accentuates the need for proper monitoring of not just the technical activities of employees with crucial knowledge of the working of the e-government infrastructure, but also their personal traits to detect any deviant behavior. Doing that requires a careful balancing act between monitoring employee activities and maintaining citizen privacy.

## Approaches to Secure Integration

The primary requirement for achieving secure integration of disparate systems is a generic and flexible policy specification framework that is expressive enough to specify a wide range of security policies and can provide a semantic basis for policy composition and modifications (Hosmer, 1991). Role-based access control (RBAC) has emerged as the most promising approach for the specification of diverse security policies, because of its policy neutrality and flexibility, that facilitates policy integration in multi-domain environments (Joshi et al., 2001b). Significant security administration benefit is provided by an RBAC approach through use of role hierarchies that define role-role relationships. RBAC based policy and metapolicy frameworks can be used to allow autonomy and transparency for the policies of individual domains and facilitate policies' continuous evolution.

Database schema integration techniques using data dictionary approach can be used to address the semantic heterogeneity problem (Batini, 1986). Additionally, emerging XML and Semantic Web technologies have shown significant promise for addressing the semantic heterogeneity problem while integrating diverse systems. In particular, use of ontology to assist in semantic mapping between security policies of different domains is becoming a possibility because of the tools such as *resource definition framework* (RDF), *DARPA Markup Language + Ontology Inference Layer* (DAML+OIL) and/or *Web Ontology Language* (OWL). Ontology can be defined as "*the specification of conceptualizations used to help programs and humans share knowledge*" (Gruber, 1993). Security "ontologies" may be used to capture the names used to indicate various security attributes and their intended semantics and relationships in different security domains (Qin, 2003). Similarly, the domain ontologies related to information in different security administration domains can provide a basis for identifying information objects and their associations that need to be protected against unauthorized access.

For a loosely coupled system, secure interoperation may be achieved (Joshi et al., 2004): (1) using pre-defined role mappings, which requires a specification of the level of sharing between the interoperating domains; and (2) using certificates for the arbitrary role-mappings, which involves an understanding of the kinds of accesses given to a principal depending on his credentials. This may require a *trust negotiation* and/or a *trust management* framework. Trust negotiation technologies facilitate willing partners to cautiously form a loosely coupled environment through controlled dissemination of sensitive policies by employing negotiation strategies to agree on the level of sharing of information, particularly in peer-to-peer environments. Several trust negotiation languages have been recently proposed, such as Trust-X (Bertino, Ferrari, & Squicciarini, 2004) and X-TNL (Bertino, 2004). An RBAC approach to trust management can be used to address security problems in decentralized multi-domain environments. One such language is RTML (Li & Mitchell, 2003). Some other proposed trust management solutions include TrustBuilder (Winslett et al., 2002). Other works related to the integration of multiple policies have been primarily in the context of multilevel security models (Bonatti, Sapino, & Subrahmanian, 1996; Gong et al., 1996). Recent work include trust based approaches and role-based approaches (Gavrila & Barkley, 1998; Piromruen & Joshi, 2005; Shafiq, 2005).

A promising new approach to achieving secure integration is using the newly emerging Web services based architecture, in particular for loosely coupled environment (Medjahed, Rezgui, Bouguettaya, & Ouzzani, 2003). Secure interoperation between Web services involves trust management, which can be handled through WS-Trust. Other architectural methods include common object request broker architecture (CORBA) and OSF distributed computing environment (DCE). CORBA and DCE do not have formal semantics for policy specification and thus make security mechanisms more or less ad-hoc (Joshi, 2001b).

For federated systems, the role hierarchies and constraints of the domains are integrated to ensure that the principles of autonomy and security are not violated. In the process, new role-relations may need to be created between roles of the different domains (Joshi et al., 2004). Traditional database federation approaches have been found very useful for implementing tightly coupled environment. Database integration is applied to policy integration, by which global authorization policies are mapped to the local rights (Jonscher & Dittrich, 1995). Besides RBAC, DAC and MAC, access control approaches based on credential certificates in multidomain system have been addressed (Joshi et al., 2001a).

Interoperability of workflows across different domains in e-government system will be a significant challenge, as it needs to integrate processes that span multiple transactions across multiple systems. Work related to security of workflow systems or task oriented systems are limited and remain a significant challenge (Atluri, Huang, & Bertino, 2000; Joshi et al., 2001b). Table 1 shows a comparison of various access control approaches.

To manage secure integration of multiple heterogeneous policies in an e-government environment, a multiphase approach, depicted in Figure 2 is desirable (Joshi et al., 2004). The pre-integration phase deals with the bookkeeping aspects of integration involving maintenance of detailed semantic information about policy entities, such as the roles and rules of the individual do-

*Table 1. Access control approaches and features compared*

| Approach | Features |
|---|---|
| DAC | Ownership based, flexible, most widely used, does not provide high degree of security, and hence low assurance |
| | Typed versions such as SPM, TAM and DTAC are expressive but have little or no experience base |
| | DTAC can handle dynamic changes and task based control |
| | Most cannot be used where classification levels are needed |
| | Typed versions have tried to include classification levels |
| MAC | Administration based |
| | Information flow control rules; uses classification labels |
| | High level of security, and hence high assurance, but less flexible |
| RBAC | Policy-neutral/flexible; Principle of least privilege |
| | Separation of duty; Easy administrative features |
| | Able to express DAC, MAC and user-specific |
| | Can be easily incorporated into current technologies |
| | Good potential for use in multidomain environments when policies are expressed using role hierarchies and constraints |
| Access control for Tasks or workflow Systems | Task-oriented authorization paradigm, RBAC for WFMS |
| | TBAC is at an initial stage of development |
| | Key for success of transaction intensive DG environment |
| Certificate-based | Utilization of existing PKI facilities |
| | Complements the host's access control model |
| | Can use trust centers in the WWW |

mains, and domain attributes that can assist in detecting semantic differences. Information maintained in this phase can also be used for managing incremental changes in domain policies. The policy comparison phase involves detecting semantic conflicts, including naming conflicts among domain roles, or structural conflicts among role hierarchies. Semantic conflicts among these entities can be detected by comparing the information obtained in the pre-integration phase about various domain entities. Developing techniques for automatic detection of semantic conflicts is a challenging task. The policy conformance phase focuses on resolving semantic and rule conflicts. A key challenge is to develop automatic techniques to synthesize mediation policies. The overall process of generating a correct and consistent mediation policy is typically an iterative process. In particular, considerable restructuring and refinement of the mediation policies may be needed. Such iteration, in conjunction with the policy conformance phase, is carried out by the merging/restructuring phase. The methodology can be augmented by assurance-based risk assessment of the domains engaged in cross domain interactions.

## CONCLUSION

A key challenge to e-government infrastructures is the secure integration of the disparate information systems associated with the different government agencies, public-private sectors, as well as individual citizens. In essence, the e-government environment is a multidomain environment that needs to facilitate intense inter-domain interactions. This raises serious concerns related to semantic heterogeneity, secure interoperability, risk propagation, and the overall management of the integrated infrastructure. Diverse sets of security models and mechanisms are available to address different issues such as access control, authentication, and auditing; however, a holistic approach is needed to address the system-wide issues and requirements. These challenges could pose a roadblock to the timely deployment and the success of the e-government infrastructures.

## ACKNOWLEDGMENTS

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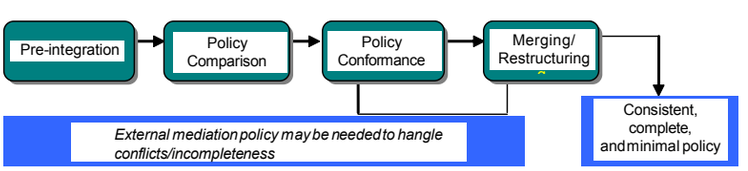
*Figure 2. Policy integration phases*



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## KEY TERMS

**Cascading Problem:** The problem that exists among different domains employing different sets of multilevel security levels, such that the higher security level of one domain is a lower security level of the other. If both systems are individually compromised, the interoperation will allow sensitive information from the system with higher sensitivity levels to be leaked to the one with the lower sensitivity levels.

**Loosely Coupled:** When systems unknown to each other dynamically establish transient partnerships and facilitate cross domain interactions for a short period of time, they are said to have formed a loosely coupled environment.

**Ontology:** A classification of the concepts in a system and the relationships between these concepts.

**Role-Based Access Control:** The form of access control approach where users are made available permissions they require within a system based on their roles in the organization.

**Secure Interoperation:** When different security domains allow cross domain accesses, and these accesses conform to the defined local policies as well as the established cross-domain access policies, they are said to engage in a secure interoperation.

**Semantic Heterogeneity:** The differences between the meanings and concepts attributed to similar entities, and the similarities between the meanings attributed to different entities by different domains refer to semantic heterogeneity.

**Tightly Coupled:** When two systems, previously known to each other, tightly integrate their policies to maintain high degree of information sharing and cross domain interactions, possibly on a permanent or a long-term basis, they are said to have formed a tightly coupled environment.

**Trust:** A certain level of assurance an entity has on another system that it will act as it is supposed to.

# Information Security Management in Digital Government

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## INTRODUCTION

Ensuring security for its information systems, including computers and networks, is a fundamental prerequisite for a digital government to function to the expectation of its people. The security problem can be "visualized" by projecting it onto a three-level hierarchy: management level, system level, and application and data level. The key elements of information security include integrity, confidentiality, availability, authentication and non-repudiation, which have to be taken into account at different levels within the hierarchy. Since there are specific articles in this encyclopedia to address the security issues at the lowest two levels, this article will focus on the management level at the top level of the hierarchy.

At the management level, the main emphases are to prevent security breaches from happening and to minimize the impact when security events happen. The decision of security investment and deployment requires clear identification of risks posed to the information systems and feasible cost analyses. In addition, to ensure that the investment and deployment are worthwhile, information security policies and procedures have to be thoughtfully devised and effectively enforced. Therefore, at the management level, *risk assessment*, *cost analysis*, *policymaking*, *procedure definition,* and *policy and procedure enforcement* have to be looked into.

## RISK ASSESMENT

Risk assessment is a systematic approach to identify critical risks, analyze the impacts of the risks and mitigate them. With limited resources for putting in place a security process, a digital government has to assess potential risks to ensure that resources are deployed in an optimal manner. Therefore, the following steps, namely *risk identification*, *risk impact analysis* and *risk mitigation*, have to be taken.

- **Risk Identification:** The objective of risk identification is to delineate those risks that can have significant impact on the functionality and credibility of the digital government. Aspects to be looked into include *technical source of risks*, *procedural source of risks* and *probability of security breach* (Rajput, 2000).
  - **Technical Source of Risks:** Weaknesses and limitations inherent in the employed techniques, such as the encryption, firewall and so forth, need to be identified. For example, as computing power keeps increasing, the strength of the data encryption standard (DES) (Stallings, 1998), which has been in widespread use for some 20 years, is pushed to its limit and no longer deemed as secure for critical processes.
  - **Procedural Source of Risks:** Procedural controls in administration processes and system access processes may also have some loopholes to be covered. Personal behavior and organizational culture may also have influence on procedure and practice.
  - **Probability of Security Breach:** Probability of the occurrence of potential risks needs to be studied so that risk impact can be objectively analyzed. A model for calculating the probability of a breach occurrence can be found in Coleman (2003).
- **Risk Impact Analysis:** With the potential risks identified, impacts on the following aspects need to be analyzed.
  - **Credibility of the Government:** "Visible" security breaches, physically significant or insignificant, can harm the credibility of the government and reduce its people's confidence in it. For example, the reputation of a government's ability to protect its information or even its people may be compromised if the

images of the national flag on its governmental portals are replaced by its rival nation with the images of the latter's national flag.

- **Information Availability and Service Continuity:** 24-hours-a-day/7-days-a-week information availability and service continuity are the key requirements and characteristics that distinguish digital governments from traditional governments. Unavailability and discontinuity of information services will certainly have prominent impact on the functionality of the government, and therefore need to be analyzed.

- **Risk Mitigation:** Risk mitigation is the process of using effective controls to minimize the impact of the risks to an acceptable level. This process enables the government to determine how much risk it is prepared to take and to what extent its assets and data should be protected. To mitigate the impacts of the potential risks on the digital government, essential technological security controls need to be put in place, and procedures and practice guidelines have to be drawn up.

The level of acceptable security is determined by weighing the probability of threat against the cost of putting up resistance against the threat. Within the level of acceptable security, identifying and attempting to mitigate the risks with low probability of occurrence have insignificant value. There is a wide spectrum of implications stemming from the need for risk mitigation, such as cost, policy formulation or even cultural change among the civil servants of the digital governments.

## COST ANALYSIS

Effective security mechanisms require a process that allows digital governments to determine informatively the acceptable level of security within which risks are mitigated to a minimum. Once the security level is determined, cost analysis aiming at reaching that level can then be carried out. Cost analysis includes:

- *Direct financial costs* incurred by the acquisition or lease of security assets and services, such as network monitoring devices, firewalls, encrypting routers and lease of Virtual Private Network (VPN) services. In addition to the hardware and software, a department charged with the responsibility of ensuring information security has to be established. External or independent audits also have to be involved regularly for reviewing the security practices and procedures, assessing unidentified risks, and making recommendations and reports. These all add up to a significant overhead.
- *Indirect performance costs* incurred by the incorporation of processes of authentication, administration, encryption, integrity verification, policy enforcement and so forth. Some of these processes will directly reduce the performance and efficiency of the IT systems. Some (e.g., policy enforcement, security controls and security audit) may result in rivalry between government agencies, which may cause ill effect on the performance of the government itself rather than on the information technology (IT) systems.

## POLICYMAKING

Security policy is a set of rules that regulate how a digital government manages the risks and protects its data and information systems. This has to take into account the management, uses and distribution of its information and IT assets. Aspects to be looked at when formulating security policies include:

- **Standards:** Any digital government committing to information security needs to look for guidance to achieve consistent, comprehensive and assessable security. Several standards providing useful guidance are now available. BS 7799/ISO 17799 (BS 7799 Part1, 2000) is one of the most prominent standards.
- **Data Classification:** Over-protection might have negative impact on the performance of the government, while under-protection may compromise the security. Data classification facilitates selective security enforcement.
- **Regulation of Use of Data and Assets:** For example, the use of live information for development and testing should be prohibited and the use of sniffers (i.e., software or devices monitoring data flowing over networks) has to be regulated.
- **Human Rights and Privacy:** Regulations governing the protection of human rights and privacy is the part of a digital government's commitment that has to be addressed in the security policy.
- **Response to Warnings:** Digital government agencies should set up pre-defined procedures and actions to take in response to security incidents of different levels of security concerns or warnings issued by security organizations, such as the Computer Emergency Response Team (CERT), so that the agencies could respond promptly.

- **Security Awareness Education:** Government employees and system users should be made aware of the security policies, practice codes and responsibility. Security training should be provided to all personnel involved in the design, implementation, maintenance and use of the information systems.
- **Liability:** Individuals subjected to the security policy must understand their responsibility and liability. Legislation governing information security should also be in place and up to date.

## PROCEDURE DEFINITION

While policies are rules describing *what* and *why* of information security within the digital government, procedures are more detailed and precise documents telling *who*, *when* and *how* of information security. These procedures should include:

- **Secure Backups:** Backup procedures should include:
  - Backups for configurations of information infrastructure.
  - Backups for servers that provide network/Web services.
  - Distributed off-site storage backups.
  - Regular verification of the integrity of the backups.
- **Assets Certification:** This to ensure that assets used in the information systems comply with specific security requirements.
- **Audit Trails:** Activities on the information systems should be noted, monitored and analyzed so that security events can be prevented or traced. Configurations of network infrastructure have to be verified to ensure their validity.
- **Plan for Disaster:** There is no such a thing as a 100% secure system. To ensure a digital government can still continue to function properly when the worst strikes, a contingency and recovery plan for crisis management is of paramount importance. This should include computer security incident response procedures (CSIRP).

## POLICY AND PROCEDURE ENFORCEMENT

Enforcing security policies and procedures is a constant endeavor of a digital government. Complying with standards is an effective way of policy and procedure enforcement. Two good sources of information to look to are BS 7799, which is a standard consisting of two parts (BS 7799 Part 1, 2000; BS 7999 Part 2, 2002) that set out the requirements for an information security management system (ISMS). They help identify, manage and mitigate the impact of risks to which information is constantly subjected. Part 1, divided into 10 sections and internationally adopted under the ISO reference ISO/IEC 17799, contains explanatory information and guidance. Part 2 suggests a model for organizations to build and run their ISMSs. Another useful resource is the Turnbull Report (Turnbull, 1999), which sets out how organizations should comply with the requirements for financial and operational controls to tackle the issues of risk management.

Another way of enforcing policies and procedures is regular audits, which help the government agencies review their systems and security practices, and identify overlooked risks.

## CONCLUSION

Information security can be visualized by projecting the security problem onto a hierarchy consisting of management level, system level, and application and data level. Policies and procedures determined at the management level set out the guidelines and rules that govern the security implementation at the other two, lower levels. To establish effective policies and procedures, the managerial staff at the top level needs to properly assess the risks. Risk assessment includes risk identification, risk impact analysis and risk mitigation. Complying with standards facilitates effective enforcement of security policies and procedures.

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## KEY TERMS

**Audit Trails:** A chronological log keeping track of network traffics, system activities and abnormal behaviors that provide clue to security breaches.

**Computer Emergency Response Team (CERT):** An organization that provides services regarding security issues of computer systems and networks, such as technical assistance for responding to computer security incidents, raising public awareness of computer security issues and product vulnerability assistance.

**Computer Security Incident Response Procedure (CSIRP):** CSIRP is a procedure spelling out the actions an organization should take when information security breaches occur.

**Data Encryption Standard (DES):** A symmetric secret key cryptographic scheme operates on a 64-bit message block using a 56-bit secret key. The characteristic of symmetry means that encryption and decryption use the same secret key.

**Information Security Management System (ISMS):** ISMS is a systematic approach to managing and protecting sensitive information of an organization so it remains secure. It encompasses people, processes and IT systems.

**Risk Assessment:** A systematic approach to identifying critical risks, analyzing the impacts of the risks and mitigating the risks.

**Risk Mitigation:** A process of using effective controls to minimize the impact of risks to an acceptable level.

# Information Sharing as a Democratic Tool

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*... the degree to which organization members at each level in an organization have a reason to be willing to share information is often the single most important factor in the design of any e-governance program.* (Perri, 2004, p. 39)

## INTRODUCTION

This section begins by looking at ways in which governments can facilitate better access to information in both the public and private sector. This is an important factor in the e-governance equation. Information sharing is an essential activity for government for any form of e-governance program to succeed, because information provides the evidence of a correspondence (or lack of correspondence) between policy and reality. The particular emphasis herein will be on the growing influence of the Internet and all the new, emerging communication technologies through which services can be delivered in all sectors of society. The role of the Internet and the growth of electronic democracy are briefly explored.

Part of the rhetoric of both information management and public consultation is the notion of information sharing. This concept is, in fact, one of the central tenants of knowledge management. Despite these good intentions, however, management gurus (Drucker, 1999) find themselves continually admonishing both organizations and knowledge workers of the need to share more information. Is there an information gap between colleagues, so that work is impeded or prevented because co-workers don't communicate with one another? And by the same token, is there an information gap between knowledge workers and the public, so that the public cannot make informed choices about important decisions?

### The Role of Government

Governments are particularly interested in the answers to these questions, because they are held to a higher standard of accountability than the private sector, and any suspicion that strategic information is being intentionally withheld is sure to further erode the sense of legitimacy people feel towards their governments. One can infer that some sort of information gap does occur, else there would be no need for continual injunctions to overcome it. Diagnosing why it occurs and how to cope with it has become a growth industry (Rumizen, 2001).

One reason for the existence of an information gap in governments is that neither the information holdings nor information management have been rationalized as computerization and digitization have grown (Milner, 2000). These sections of the bureaucracy have always felt both under-funded and understaffed, so they were struggling just to keep up with current requirements, never mind planning to do better. Professionals such as information and knowledge managers usually advocate that governments devote the resources and make the effort to be both more systematic and share more widely when it comes to the way information holdings are organized and the extent to which information outreach is practiced (i.e., keeping the public informed).

Data protection (also known as privacy laws in many countries) is currently the major information issue that covers both the public and private sector. In a very short period of time, we will likely see freedom-of-information expand from the conditions for access to government documents to encompass both the public and private sectors. Information best practices also need to be written to help the developing world. In an information-rich era, combined with the rise of the dominance of the Digital Age in many countries, great potential exists to democratize information at all levels of society throughout the world. Due to our new information technologies (ITs), information is not only a commodity to be bartered in the marketplace, but a potentially powerful democratic tool.

### The Context of Information Sharing

The wide variety of practices leads to an important question: Is there an objective (i.e., politically neutral) way of assessing the actual value provided by governments when they share information with the public? Unfortunately, at this level of aggregation, the question is both

too vague and too encompassing to elicit a meaningful answer. Nevertheless, the question can be deconstructed and dealt with in terms of its various aspects.

This is perhaps one of the most interesting times, given that we are undergoing an evolution as to how we live and operate as a society. We are witnessing a phenomenal rate of change in societies around the world in a very short period of time. Even as long as 11 years ago, a survey of IT showed that the global impact of computers and communications was already measurable and profound (Dordick & Wang, 1993). Both production and distribution in every industry are increasingly becoming mediated with electronic technologies. Access to information can enable both the tracking of processes already in motion and the altering of conditions about to unfold. Hence, the key to understanding and controlling social change is good information sharing.

Even while operating at less than full efficiency, the combination of computers and communications (i.e., the Internet) has transformed the quality of working life, social life and personal life to an extent that was probably never before experienced in human history (Buick & Jevtic, 1995). Everyone benefits through processes informed by more information and better information, even those individuals who do not personally use computers or have access to connectivity. So the information that supports the knowledge society has great potential to supply timely and correct evidence for both social and business policies. But the only way such benefits will actually accrue to society is if this knowledge is actually used to improve or change the conditions of peoples' lives. In other words, information must complement reform if things are going to improve for the better. Information by itself has no magical ability to stop pollution, prevent crime, create jobs or rectify injustice. Is the knowledge from the Internet used for these purposes? That can only be assessed on a country-by-country, community-by-community, case-by-case basis.

## INFORMATION SHARING AS A DEMOCRATIC TOOL

Many countries have adopted explicit programs to put "Government Online" so that the layout of documents and navigability of government Web sites are more user-friendly (Nielsen, 2000). The rationale for these programs has been that as more of the public goes online, users of government information will not be happy if they can't find material that was promised or is expected because it is hidden as a result of poorly conceptualized categories or poorly organized hyperlinks. Considerable progress has been made on this front to make document search intuitive so that average members of the public can navigate their way to whatever is available on government Web sites.

Whatever the opinions or views of individuals and governments in society, it is evident that we need a far deeper debate and discourse over the impacts of technologies. There are concerns over ensuring that all citizens have universal access to the Internet (and are free to use it or not use it as they wish); there are serious, abiding anxieties about the digital divide that is occurring throughout the world. One of Marshall McLuhan's lasting legacies is the recognition that the advent of technologies is not an unalloyed good—sometimes over-use can reverse the benefits that were intended.

### The Need for Policies

As the Internet takes hold in our daily lives and begins to take a new and ubiquitous shape and form, the need for governments to develop information policies to suit the changing nature of these technologies is becoming more evident. The direction to be given to these policies can come from the simple maxim that people are entitled to receive information about anything that has a bearing on their well-being. The World Wide Web is now so big that some Web sites are not even getting joined to the network of networks because there might be a connection problem in their local area. Also, government and private organizations over the past few years have Web sites that can only be accessed through their own Intranets, or by having a specific address for a Web site with a password to enter. Google is an excellent search tool, but is only as good as the information it can access in the public domain.

The world is at the fingertips of the citizen, but the new challenge is actually finding what is out there and getting access to the vast amounts of information that both government Web sites and departmental databases possesses. The government of Canada is working to find ways to merge its databases to enable the citizen to take advantage of information stored by government. Many technical problems are being faced. This attempt to find ways to provide more information to the citizen reflects the desire to respond to a growing information-aware society.

## THE SHAPE OF INFORMATION RIGHTS TO COME: DEMOCRACY'S BEST TOOL

Regarding the variety of information within government databases about existing policies and procedures, there

are often background papers or official pronouncements available on government Web sites that lay out in general terms what policies or directions the government is committed to or contemplating (Hunter, 2002). Policy experts, public interest groups, and business people or representatives usually find these materials useful but generally too vague or theoretical. More detailed information on these topics would assist those who will be affected to make the necessary adjustments, but that in turn can commit the government to alternatives it either hasn't thought through yet or wants to have some discretion with during implementation (Kettl, 2002). What has the potential to open this area to wider information dissemination and public participation is the growing practice of participatory rule-making (Kerwin, 2003).

In some American states, some federal departments and, increasingly, in other countries, stakeholders in a statutory/regulatory policy area are being invited to help write the rules that will implement the legislation. This requires participants who are well enough informed to actually contribute to the process, and to arrange that informative Web sites on every case are created (and supported in the back office). This way, all of the relevant material is continuously available, and responses and feedback can be e-mailed back during the lifetime of the project. Much more of this kind of information sharing would be helpful to anyone interested in a specific program, statute or regulation.

## Information Security

In the new digital environments, citizens are increasingly demanding more privacy rights to protect their personal information. However, there is also a contradiction here, because at the moment, citizens are sharing and using personal and aggregate information more than ever before. But in a cyberspace environment, the citizen is becoming increasingly sophisticated in understanding the impact that information can have on one's life. The individual wants to ensure that one's own personal information is not abused. The individual wants the ability to control his or her personal information environment in cyberspace. At the same time, the individual wants unfettered access to all manner of information. But the sheer amount of information available, the ability to communicate information and the value that individuals put on information is bringing a new understanding of the nature of information itself.

Thus, on the side of freedom of information, the public is starting to demand more information for all facets of its life. We see more data on labels of commercial products; shareholders demand more information about the activities of the companies in which they are investing (not just the usual hyped good news about the company's activities in the past year). Much of this trend has been driven by the alleged financial malfeasance of companies such as Enron and WorldCom in the United States (U.S.) and Nortel Networks in Canada.

## Democratic Accountability

Citizens want to share more information about many activities in society. The Information Age appears to be bringing more demands for accountability. In years to come, the public will expect more accountability in the form of enlightening information from private and public organizations alike. Much of this is being driven by the Internet, where there is now so much discourse, exchange of information and thousands of blogs. The Internet is an open network contributing to the development of open environments. This idea is now spreading into society as a whole, resulting in demands for more and more accountability from all our public- and private-sector organizations. In the face of such demands, those who manage information repositories are beginning to consider the possibility of offering voluntary sharing rather than being forced into mandatory disclosure.

Making available information about the future developments of policies and programs is the most problematic part of government information distribution. There are a number of reasons for this – one is the nature of representative government itself. Many public officials, both elected and appointed, see policy development as their prerogative in so far as it reflects a division of labor within governance (Rhodes, 1997). It is a role that many of them guard jealously and share only reluctantly (Cullen & Cushman, 2000). In this context, sharing more than a minimal amount of information about prospective policy development could be interpreted as the thin edge of the wedge that would eventually erode their role in policy-making itself. The other side of this coin is the firm belief by these same public officials that most people either do not want, or are not willing to take the time or give the effort necessary, to become effective participants in governance.

## Information Rights

We currently live in an age of individuals' rights developed in the late nineteenth and twentieth centuries. This will change, as the recognition dawns that it is also aggregate rights that strengthen the citizenry as a whole. As this idea flourishes, demands for information on a more sophisticated level will grow. Information rights will become a part of civil society's infrastructure. As the knowledge economy grows, and the knowledge professional comes to be seen as a continuing, powerful force

in our society, so will the demands for wider swathes of information grow. It might seem at the moment that we already live in a world with too much information. The change in this demand for information will be for relevant information that enlightens, not overwhelms, the citizen. These trends are creating increasingly new problems for governments. In the spreading e-democracy movement around the world, the major emphasis is on how governments can better provide information to the citizen and how the public can take advantage of what is available from government. Technology is the key driver in finding ways and means to allow the public to access public information.

Not everyone wants or will use more and better information if it is provided by governments on their Web sites. But a growing number do want it, and will use it, so the question really is whether governments will recognize the wave of the future and surf it willingly. In Canada, for example, 52% of citizens online go to government Web sites for a variety of usages.

The information issue now has a new form. Governments are also going to be subject to pressures from emerging information trends in society. For example, the secrecy of governments, at the moment, is defined by the degree to which information is shared with the public. The weakness of a freedom of information law is shown by the narrowness with which governments exempt withholding of information from the public. But governments need to do more than just pass or amend freedom of information laws. In our new environments, we have to look at information as the social force it has become. Changing environments are beginning to bring different attitudes.

## Responding to Public Demand

Once governments put content online, a policy issue immediately emerges. The private sector learned this in the early days of the Web. The growth of online marketing and e-commerce brought with it major privacy and copyright issues. For the citizen who is going online for government information, if a request is rejected, the issue becomes: Why can I not have access? Part of the answer to this is that government departments and agencies decide in advance what information can be public, based on their respective freedom of information laws, and only make documents publicly available very selectively.

Almost all policies, statutes and regulations will impact the public in terms of one or more of (a) taxes paid, (b) revenues spent, (c) actions required, or (d) actions prohibited. In addition, government programs usually also affect how the economy functions in general, and how companies operate in particular. The more such impacts can be known in advance, the more opportunity there is to begin the adjustment process as soon as possible, so that new requirements do not hit the public suddenly and traumatically. And for every option foreclosed, others are just as likely to open up, so planning can begin to take advantage of the new arrangement and either minimize losses or maximize gains. The new expectations for transparency now require that such information be made available to the entire public (Oliver, 2004).

In an information-intensive society, citizens might want more from both governments and the private sector alike. The above is simply an overview of the emerging issues and problems. Solutions need to be sought as these new technologies become even more persuasive forces in our society.

# POSSIBLE SOLUTIONS: INFORMATION AS A PRACTICAL TOOL

There is a good model to be followed not only by national governments but international organizations. If we are to handle the digital divide between those who have the opportunities to be online and the vast numbers of people who cannot necessarily afford the costs of going online, it is going to be essential to level the playing field. In any populist democracy, it is important that such initiatives embrace all the people**.** At the moment, it is estimated there are only between 150 and 200 million people online. These are small numbers, where our world population has exceeded 6 billion people.

More publicly provided connectivity, such as through libraries or community centers, could help disseminate more government information to the citizenry (Gurstein, 2000). More declassification of mundane information by government would also be helpful for that goal. The policy of cost recovery through the charge of fees on downloads could also be reviewed, since most of the cost with hard copy production and distribution previously was for printing and mailing, both of which are now dispensed with because of Internet availability and end-user printing. The actual cost of gathering, analyzing, reporting and posting the information is the kind of expense governments have previously borne as part of their mandate, and a return to that policy would also greatly assist information dissemination.

International organizations could also provide programs to educate people on usage of the Internet. Education then leads to individual usage. It usually will vary between individuals, but through knowledge of how to use the Internet people can be participants in this more encompassing form of democracy as they see fit. Such programs can embrace many people around the world and

ensure that the users who most benefit are not just those in the affluent, industrialized countries.

## Guidelines for Better Performance

National government should seek ways to engage its citizenry in the process of government. It can do this in such information-sharing ways as:

- Making more information available online from government itself to ensure there is an informed citizenry
- Providing Web sites that seek input from people on all manner of government programs and issues
- Developing listservs and discussion groups on important national issues and other means to engage the citizenry
- Providing grants to organizations seeking online democratic activities
- Developing local community projects that embrace all levels of society, from the academic world to businesses large and small to non-profit and volunteer organizations; this can encompass governments in developing countries
- Developing easy-to-use Web sites to facilitate seamless access by citizens
- Ensuring information on Web sites is easily attainable in a form understood by the citizen and can be easily downloaded
- Providing supplying search engines and hot links to ensure that citizens get what they want in the right format from the right agency
- Giving the populations of developing countries access to the Internet by developing information policies and policies to implement different communications technologies that will encompass all the citizens in the countrie.
- Designing programs to teach local leaders, public-minded citizens and volunteers in the communities to become information facilitators;

## CONCLUSION

The Internet is a medium that has allowed people to involve themselves in the democratic process in new and unique ways. Governments at all levels and international organizations will increasingly be impacted by these changes. Thus, there is also a need for awareness building within governments and international organizations of the changes that are occurring. This can be accomplished through educational and training programs. Disseminating information on a wide basis can improve conditions in a country. Information sharing from government is the lynchpin of the knowledge society. For such a society to evolve worldwide, it is incumbent on governments to do what they must to bring all its people into this new economy.

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## KEY TERMS

**Accountability:** Making organizational proceedings transparent and explaining and justifying decisions and choices in terms of stated policies and procedures.

**Connectivity:** Linkage of computers to telecommunications networks so that users can access the Internet and the services on it (such as the World Wide Web and e-mail).

**E-Governance:** Digitizing government information and placing online document dissemination, information solicitation, workflow coordination, service delivery, consultation and voting.

**Freedom of Information:** Legislation and regulations that require public requests for information be granted in a timely fashion and when mandated, at a standardized price.

**Information Rights:** The public's right of access to organizational information, and policies and procedures assuring that the information is used only for the purposes specified when gathered.

**Information Sharing:** The exchange of information within and between governments and between governments and the wider society.

**Privacy Protection:** Provisions that assure that access to information on specific individuals and groups is limited to those with specific authorization, and that confidentiality is maintained.

# Information Society Industrial Policy

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## INTRODUCTION

In order to discuss e-government in the context of industrial policy, it is necessary to examine the industrial policy concept as such. Industrial policy is not a term often appearing in encyclopedias or handbooks of economics and there is no general understanding of the concept in the economics literature. Nevertheless, it is a concept which has played and continues to play and important role in discussions on the economic development of nations and regions.

## BACKGROUND

In some presentations on the issue of industrial policies, the concept is associated with policies to strengthen manufacturing industries as opposed to services. This was, for instance, a theme in the American discussions on deindustrialization in the 1980s and early 1990s, and it is also a theme in the presentations of the European Commission on industrial policy—for example, in the communications of the Commission on "Industrial Policy in an Enlarged Europe" (CEC, 2002, 2004). However, this is not the most common understanding of the term. Usually, the word "industrial" is not related to industry of the manufacturing kind alone but to business in general, encompassing manufacturing as well as services.

Another line of division in the different interpretations of the term relates to whether industrial policies are sector related or could be horizontal (cross-sector) as well. Laffont (1996), for instance, operates with a broad and horizontal understanding of the concept of industrial policy as does, for example, Cowling (1999) in *Industrial Policy in Europe*. In this perception of the term, industrial policies can very well be horizontal in the sense that public authorities of one country may want to promote all forms of enterprises in their own country. Industrial policies are thus considered as national policies to promote the industrial development of a country in the international setting (Cowling, 1999).

It has also been argued that there can be a close relationship between horizontal and sector related policies in the sense that the general goals can be of a horizontal character, while the means can include sector-oriented initiatives. In a paper on "Industrial Policy in the Economics Literature," Navarro (2003), for instance, writes: "Policy has to be tailored to specific sectors and develop competencies that are specific to the local/regional context. Getting the horizontal policies right is essential, but a narrow focus on horizontal policies alone will only have a mild effect" (p. 14). A close relationship between horizontal and sector related initiatives can be seen in the case of policies to promote information and communication technologies (ICTs), as ICTs are seen as generic and pervasive with implications for almost all other industrial sectors. Support for the growth of use of ICTs and, consequently, for the growth of the ICT-producing industries may lead to a general promotion of all industries.

Generally, however, industrial policies are seen as sector related policies—that is, policies aiming at promoting specific sectors in the economy. This can be either sunset industries as shipyards in Europe, or sunrise industries as the ICT and biotechnology industries are normally considered to be.

The sector-oriented industrial policies can encompass all kinds of initiatives, which are intended to promote specific industrial sectors. Often, industrial policies have consisted of direct economic aid (subsidies or tax arrangements) or protection (tariffs), but they could also be research and development (R&D) policies or educational policies aiming at promoting specific industries, and they could be policies supporting demand for the products of certain sectors.

Industrial policies, however, do not include all kinds of economic policies. General macroeconomic stabilization policies (e.g., monetary or financial) and general competition policies are not included in the industrial policy category. It is only if sector-specific competition policies are implemented that competition policies are regarded as part of an industrial policy. To be characterized as an industrial policy, there must be something in

*Table 1. Scope of industrial policies*

| | Sector oriented | Horizontal |
|---|---|---|
| Supply support | XXX | X |
| Demand stimulation | XX | |
| Regulatory framework | X | |

addition to the creation of a favorable general economic framework, either directed at specific sectors in a national context or at specific sectors or the whole national industry in an international context.

Table 1 shows the scope of industrial policies. The core of industrial policies includes support for the supply and the demand side of specific sectors, but industrial policies may also encompass support for the supply side horizontally and/or sector-oriented framework regulations.

## FOR AND AGAINST INDUSTRIAL POLICIES

The basic argument in favor of industrial policies is that markets seldom function optimally and that different kinds of state interventions are called for. Conversely, the basic argument against industrial policies is that state interventions will seldom make things better—but probably worse. In the language related to neoclassical economics, market failures are the arguments for state interventions, while government failures are the arguments against. In the more heterodox evolutionary economics, which does not take its point of departure in any perfect market scenario, it is not necessary to make the case that there are market failures to correct. Arguments for industrial policies can be that there are functions in the totality of the politically influenced technoeconomic developments, which public authorities can effectively fulfill (Carlsson & Jacobsson, 2004).

The discussions on the merits of industrial policies are related to two (interconnected) spheres: the national sphere and the international sphere (Navarro, 2003). It is possible to argue for industrial policies in a purely national context. The argument is that there are market failures, which need to be rectified, or functions that need to be fulfilled. The kinds of market failures or functions in question will mostly relate to positive externalities in the economy, which are not sufficiently unfolded. This could apply to all sectors of the economy and, therefore, be initiatives of a horizontal character. But it could also be a more sector-oriented initiative, for instance, in relation to ICTs, the use of which in itself has externalities attached.

Most often the discussions on industrial policies are connected with the international dimensions of the economy. In this regard, the arguments in favor of industrial policies are primarily related to the goal of obtaining or retaining a specific position in the international division of labor, for example, in relation to so-called strategic trade policies, infant industry policies, or fears of deindustrialization.

The most powerful argument against the use of industrial policy to rectify market failures is that it is difficult to see why public authorities would have insights into the functions of the markets, which could do better than unregulated market mechanisms. Furthermore, it has been argued that it is difficult to document significant positive effects of industrial policies (Pack, 2000).

Moreover, there is a risk of capture of public authorities when supporting specific industrial sectors (Laffont, 1996). The specific public authorities in question and the industries being supported may become so dependent on each other that there will be a distortion of the economic decision processes.

The most often used arguments for and against industrial policies revolve around international relations. The heart of the matter is whether it is possible for nations to acquire better positions in the international division of labor and, consequently, a bigger wealth and higher welfare. This applies to the economically poorer nations, where the issue is to get started on building up a position and an industrial basis. But it also applies to the economically richer countries, where the issue is to retain or improve the economic and industrial strength vis-à-vis other countries.

In relation to the economically richer countries, there are defensive as well as offensive reasons for industrial policies. The defensive reasons are connected with the issue of de-industrialization and with supporting industries, which (may be) more profitably could be located in other countries—the so-called sunset industries. The policies flowing from this line of reasoning can be summarized under the heading of protectionism, and one of the arguments against such policies is that it is a kind of "beggar thy neighbor" policy and that it is likely that there will be retaliations from other countries. One of the major implicit arguments for industrial policies is that other countries are taking similar steps and that industrial policy initiatives are, therefore, necessary. The more offensive reasons are connected with the possibilities of conducting strategic trade policies, that is, to promote the industries in the home country, which have a strategic character because of a value-added above the average.

Strategic trade policies were especially discussed academically in the 1980s and early 1990s. An early introduction of the theme was a publication by Brander and

Spencer (1983) focusing on international R&D rivalry. A later example is an anthology assembled by Krugman (1990) with contributions in favor as well as against strategic trade policies. In the introductory chapter to this book, Krugman (1990) discusses two of the main reasons behind strategic trade policies, rent seeking and external economies, where rent seeking is connected with the higher value-added in some sectors and external economies with the especially strong external effects of some sectors in the economy in general. Krugman (1990), in this piece, does not doubt that there are, in fact, strategic sectors in the economy, but he doubts whether it is possible for political authorities to "pick the winners." He, thereby, touches upon one of the major issues in the debates on industrial policies, where the most common point of view in the academic literature is that it is not likely that picking the winners will be a fruitful strategy and that the "choice" of winners is better left to the market.

A variation of the "picking the winners" strategy and a much more widely accepted strategy is to improve not only the general conditions for industrial development but also the more specific conditions for the development of special industrial clusters. Such a strategy is based on the understanding that industries in the different sectors are promoted by specific innovation systems, encompassing not only a concentration of certain industrial competences in certain areas but also a combination of public policies and initiatives, which create a positive framework for industrial growth (Anttiroiko, 2004; Navarro, 2003). Such an argument is also in line with the thinking of Porter (1990) on the "competitive advantage of nations," where the point is not that nations as such are competitive, but that competitive advantages in some sectors can be created and that public policies can play a role in this context.

## FUTURE TRENDS

The understanding of the setting for, for example, the European i2010 initiatives (CEC, 2005)—as for the Lisbon initiatives in general (Lisbon European Council, 2000)—is of a character often leading to industrial policy initiatives. The setup is a competitive situation with the United States and Asian countries, where Europe apparently is losing ground because of a lower economic growth than other countries and regions. This is the reason for the Lisbon agenda, which should result in Europe becoming "the most competitive and dynamic knowledge-based economy in the world" (Lisbon European Council, 2000) with ICTs having a central role in this vision. ICTs not only constitute an important industrial area in their own right but are also important for other business areas as building blocks in the communications infrastructure. The ICT sector is considered as a strategic sector in the economy.

It is in this light that the question of industrial policies is raised. The initiatives relating to the ICT field in general and to the European i2010 policies more specifically can be considered as part of and industrial policy strategy. The same applies to initiatives taken in other parts of the world, including South Korea, Japan, and the United States. Especially in South Korea, it seems as if industrial policy initiatives are playing a role in the amazing growth in broadband penetration and use of broadband communications. But also in Japan and even in the United States, first and foremost at the local and state levels, industrial policy measures are implemented.

With respect to the character of the policy actions deemed as being part of an industrial policy package, the direct economic aids and subsidies for the supply side are only marginal. However, subsidies are accepted in local initiatives, while they are seen as market distorting on a larger national scale. But there are other kinds of initiatives, which help supporting industries supplying ICT goods and services, namely public R&D and education policies. In this connection, it should be mentioned, that education policies also can have an impact of the demand side, in the sense that education of users can promote the use of ICTs.

Stimulation of demand and public procurement policies, on the other hand, have a much larger role. This is seen as being in full accordance with liberal market policies, as long as there is no preference for specific providers in a national context or for nationally based companies in the international arena. In connection with the emphasis on the demand side, there is also an increasing interest in policy initiatives being directed toward the content aspects as opposed to the network aspects.

## CONCLUSION

In summary, six different modes of policy initiatives/tools are listed—with the lightest forms of market intervention first and the strongest at the end. All of them can and are mostly included in national strategies for the development of the industrial base in individual countries. The conclusion is that while industrial policies formerly had more emphasis on financial support, public support is and will in the coming years much more center on technology policy.

- Strengthening and harmonization of the internal uses of ICT infrastructures and services in public institutions.

- Construction of communication systems and structures in relation to the citizens and business enterprises—with influences on the take-up and forms of communications used in the society at large.
- Facilitation of the development of communication systems. This may include creating more transparency in the markets by way of public information on qualities and prices of communication services, and it may include the setting up of forums for discussion of, for example, interconnection and frequency issues among the competing operators and the public authorities.
- Regulation proper, setting the "rules of the game" in the markets and the enforcement of these rules.
- Support for the demand for communications systems and services, which may be based on either the direct demand from public institutions or support for the demand from private citizens and business enterprises.
- Support for the supply of ICT equipment and services, which may involve public funds going into ICT companies, but more often has an indirect character involving public research and development and also public educations of people whose labor power will be used in business enterprises.

The two first-mentioned areas are the ones most clearly related to e-government initiatives. They relate to the use of ICTs internally in public organizations and in communications with citizens and companies. The activities of public administrations in these fields will indirectly lead to the promotion of the use of ICTs on a broader scale in society.

The two following areas are connected with the ICT sector itself—facilitating its modes of functioning and setting the regulatory framework rules. Facilitation as well as regulation can have decisive influences on the industrial development. The whole liberalization process in telecommunications has definitely had a great influence on the growth of this sector.

The last two areas, support for demand and support for supply, are the areas mostly connected with the term "industrial policy." Public support for the demand side can be important for industrial development and is seen as more acceptable than support for the supply side. State initiatives in the field can be of different kinds. State procurement in itself is important, as state organizations often are large customer, and as goods and services based on new technologies can be helped to grow in the market by means of initial fostering. But the state can also help specific sectors by promoting private demand, either by creating a fertile environment for industries, which are large users of specific goods or services, or by helping residential demand.

Support for the supply side includes direct economic support, which has often been seen as the essence of traditional industrial policies. However, this kind of industrial policy measure has lost importance in the European Union (EU) and elsewhere during the past couple of decades. In the EU it is neither favored by the individual member states nor the EU as such. Now and then, member states use direct economic support for specific industries—often mature industries in crisis and/or being challenged by competitors from other countries—but the EU seeks to prevent or, at least, limit this kind of policy, as it is seen as distorting to the competitive environment. Furthermore, it does not necessarily ensure technology development which could strengthen the possible positive external effects of the development in such sectors. Output will be likely to increase, but not necessarily technology development (Bora, Lloyd, & Pangestu, 2001).

There are, however, other kinds of policies supporting the supply side of industries and which are not only generally accepted but also considered as recommendable, as they are more certain to contribute to technology developments. This applies to R&D initiatives as well as educational initiatives, which in both cases can be of a general nature not discriminating between different industrial areas but can also favor specific sectors of the economy, which most often has been the case with publicly funded R&D—for example, the EU ICT programs from RACE and ESPRIT to the present IST programs. It also applies to initiatives promoting industrial development by way of supporting the development of innovative milieus, for instance in the form of science parks, intelligent cities, and so forth (Anttiroiko, 2004).

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## KEY TERMS

**Comparative Advantages:** According to the theory on comparative advantages, founded by David Ricardo (1772-1823), all countries have comparative advantages in a number of sectors, as a country will always be doing better comparatively in some sectors than in others. The theory has been developed since its first presentation and is the theoretical basis for free-trade policies.

**Competitive Advantages:** Competitive advantage is a term associated with the American business economist Michael Porter. A competitive advantage can be developed by a company, not a country. However, there may be specific conditions in different national contexts promoting the competitiveness of companies, for example, industrial clusters and/or specific national policies.

**Deindustrialization:** Literally, the term means that industry disappears. However, deindustrialization is a term often used to describe the decreasing importance of manufacturing industries as opposed to service sectors. The pessimist vision is that deindustrialization will mean less economic activity, while the positive vision is that manufacturing industries will be substituted for other activities in service areas with higher value-added.

**Externality:** An externality is an effect of actions of market players, which is not mediated by prices. Externalities can be positive as well as negative. R&D, for instance, can have positive external effects on market players, which are not paying the costs of R&D activities.

**Government Failure:** As a counterpart to market failure, there can be government failures. An example of a government failure could be a decision to support a specific technology development, which turns out to be a dead end in the market. Government failures are reasons for not intervening in the markets, even though problems in the markets can be observed.

**Industrial Policy:** State policies conducted with the aim of strengthening the industrial base of a country or region. General macroeconomic stabilization policies are not considered part of industrial policies. However, industrial policies can encompass a broad range of supply and demand-oriented policy initiatives.

**Market Failure:** There is a market failure when market mechanisms do not function perfectly. There can be different reasons for market failures: information imperfections, natural monopolies, externalities, and public goods. Market failures are reasons for possible government interventions in the markets.

**Sector-Oriented vs. Horizontal Policies:** Industrial policies can be horizontal and/or sector oriented. With horizontal is meant that industrial policies affect all business sectors, while sector-oriented policies only are aimed at specific sectors.

**Strategic Trade Policy:** A nation-state can be said to conduct a strategic trade policy when state support is given to sectors considered as strategic in the economy, for example, sectors with a high value-added, affecting the trade balance between countries.

# Information Systems Integration in E-Government

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## INTRODUCTION

Through e-government, an increasing number of nations are making major commitments to modernize and reform government in an effort to achieve greater efficiency, broaden access to government services and improve service levels (Schware & Deane, 2003). Technology is seen as a key enabler for e-government (Elmagarmid & McIver, 2001). Ultimately, e-government seeks to centralize and make a cohesive and seamless set of government services available to end-users. Hence, the integration of information systems (IS), both within and between different government departments, will become a critical issue as e-government matures (Golden, Hughes, & Scott, 2003).

As e-government matures, information systems (IS) integration will become critical to the ability to provide centralized and seamless online services. This article examines the different scenarios of IS integration, and discusses the critical success factors for IS integration. The architectures for achieving IS integration as also described. A roadmap for IS integration in e-government is proposed which provides a framework for more detailed project planning and technical decision-making.

## BACKGROUND

The challenge of IS integration is not specific to e-government. IS integration is also a challenge facing many organizations in the commercial sector, particularly those involved in developing enterprise-wide solutions such as e-business, supply chain management (SCM), customer relationship management (CRM) and enterprise resource planning (ERP), which require integration between "islands of applications" (Sawhney, 2001) that have traditionally operated in isolation (Markus, 2000; Themistocleous, Irani, & O'Keefe, 2001). Indeed, a study by research firm IDC (2002), based on 1,350 interviews, indicated that more than 80% of CIOs and CTOs believed integration was either mandatory for addressing mission-critical activities or a key enabler for meeting business-critical needs.

Large-scale IS integration poses at least three major problems. First, the scale of integration and sheer number of IS to be integrated can be overwhelming. Large organizations such as governments tend to have a huge portfolio of IS comprizing hundreds, even thousands of IS (Cummins, 2002). Second, the nature of IS to be integrated is usually quite diverse, including packaged applications, legacy applications, bespoke applications and a myriad of database management systems. Individual IS often have significantly different underlying architectures, with some based on legacy and others based on more modern computing technology, which impedes integration (Lam 2004). Third, older legacy IS may have been inherently designed to be standalone, or integrated with in only very limited ways. However, replacing such legacy IS, which represent huge investments in institutional knowledge, is not always desirable or feasible (Robertson 1997).

Whereas IS integration is extensively dealt with from a technology perspective, there is much less advancement in the strategic planning and management required to achieve IS integration. Such strategic issues are important for establishing an overall framework for more technical decision-making and therefore of interest to chief information officers (CIOs), chief technology officers (CTOs), IS directors and anyone involved in formulating IS strategy in e-government. This article examines strategic planning and management for IS integration in the context of e-government. The article draws from existing research in the field of IS to present and justify a roadmap for IS integration in e-government.

## INFORMATION SYSTEMS INTEGRATION

### Scope of IS Integration

Lam (2004) identifies four main types of IS integration scenarios, namely, enterprise application integration (EAI), B2B integration, B2C integration, and "Webification." The four main types of IS integration can be distinguished in terms of the purpose of integration and the crossing of organizational boundaries, as described in Table 1.

*Table 1. IS integration scenarios*

| Integration Type | Scope of Integration | Purpose |
|---|---|---|
| Enterprise application integration (EAI) | The integration of IS within a single enterprise, either within a business division or with other business divisions within the enterprise | To improve business efficiency and to meet the need for real-time information processing |
| B2B integration | The integration of IS between different organizations | B2B commerce such as integrated supply chain management and B2B trading |
| B2C integration | The integration of back-end transactional systems, often of a legacy nature, with Web-based front-end applications such as storefronts and personalization engines | B2C solutions which provide customers with a Web channel for accessing products, services, or information |
| Webification | The integration of legacy systems with Web-based applications | Ease of access to information held in legacy systems |

In the context of e-government, EAI can be compared to the integration of IS within a single government department or with other departments in a government. B2B integration can be compared to government-to-government (G2G) and government-to-business (G2B) integration. Such scenarios might arise, for example, in relation to joint government initiatives such as the combating of international crime and the need to exchange criminal intelligence. B2C integration and Webification can both be compared to a government-to-citizen (G2C) scenario, or the integration of legacy government IS with Web-based front-end applications such as citizen portals to provide services such as the online submission of tax forms.

## Levels of Integration

IS integration can be viewed at four levels of complexity namely, data, application, method and process (Linthicum, 2001). The four levels of IS integration are described in Table 2.

Various integration technologies and architectures are used to achieve integration at each of the four levels. Federated databases, triggers, and batch processing can be used to achieve data integration. For application integration, application programming interfaces (APIs) and distributed components such as Enterprise Java Beans (EJB) and distributed component object model (DCOM)

*Table 2. Levels of IS integration*

| Level of Integration | Description |
|---|---|
| **Data** | The synchronization of data held in different databases. Synchronization can be achieved either in real-time or in batch mode where some temporary delay in data freshness is permissible to the enterprise. |
| **Application** | Enabling IS to directly access functionality of other IS in a real-time fashion. Popular packaged IS such as SAP and PeopleSoft, for example, provide well-defined application programming interfaces (APIs) that expose the functionality within the IS. |
| **Method** | Providing IS with a common set of reusable business logic from which finer grain application calls are made. For example, reusable business logic for creating a new customer may trigger separate customer creation processes in several different IS. At this level, there is a clean separation of business logic from the technical means by which IS are integrated. |
| **Process** | The abstraction and definition of business process or workflow models from which relevant methods are called. Process integration is particularly relevant in collaborative contexts, such as B2B, where there are significant business information flows between trading partners. |

are needed. Method integration can be achieved using technologies such as message-oriented middleware (MOM) and Web Services. Method integration requires that individual IS are architected in a manner that exposes business services. Process integration requires the use of integration brokers and business process management tools that captures process flow across IS applications (Lee, Siau, & Hong, 2003; McKeen & Smith 2002). Such tools make use of special adapters that connect applications to the integration broker.

Integration at the process level provides the greatest level of integration flexibility. However, an organization does not necessarily need to achieve IS integration at the process level, and in some cases, data integration may be perfectly sufficient.

## Barriers to Information Systems Integration

Several authors have discussed barriers and risks in IS integration. Themistocleous and Irani (2001) identify a "laundry list" of barriers from their analysis of 15 cases in the literature: politics, resistance to change, no single EAI product to solve all problems, lack of training, additional cost of redesigning business infrastructure and processes, lack of EAI skills, cultural issues, high cost of EAI and complexity of understanding processes and systems. Because of the broad spread of barriers, some of the barriers inevitably overlap.

Other authors have focused on specific issues seen as having a critical role in IS integration. In the context of e-business, Yang and Papazoglou (2000) view integration largely as a challenge in interoperability, where compatibility in business processes and support for business transactions are two critical elements. In their work on healthcare and the integration of electronic patient records, Grimson, Grimson, and Hasselbring (2000) and Chari and Seshadri (2004) draw attention to the importance of semantic integration and common data standards. Markus (2000) identifies a number of issues in IS integration, namely (1) the modification of source systems, (2) organizational change to achieve process integration, (3) immature integration technology and (4) proprietary integration technology. Puschmann and Alt (2004) highlight the importance of selecting the right type of integration tools.

# E-GOVERNMENT INTEGRATION

## E-Government Integration Model

Building on the e-government maturity concepts mentioned by Elmagarmid and McIver (2001) and Layne and Lee (2001), the e-government integration model (EIM) produced by the author in Table 3 describes four stages of e-government integration maturity namely informational e-government, transactional e-government, pro-

*Table 3. The E-government Integration Model (EGI)*

| Maturity Level | Informational E-Government | Transactional E-Government | Process Integrated E-Government | Service Integrated E-Government |
|---|---|---|---|---|
| Focus | Information-centric | Transaction-centric. | Process-centric. | Citizen-centric |
| Types of E-Government Services Available | Access to public information (e.g., opening hours, downloading of application forms, "how to" instructions) | Relatively simple services and data collection activities (e.g., online form filling, filing complaints, e-petitions, sending enquiries via e-mail) | Sophisticated services that form part of an overall workflow (e.g., applying for a passport, applying for financial support) | Comprehensive one-stop shop of sophisticated and connected services (e.g., registering as unemployed identifies relevant support schemes available and updates tax position) |
| Scope | Intra-agency | Intra-agency | Inter-agency | Inter-agency |
| Citizen Experience | Citizen finds the relevant information on the Web site and simply reads or downloads the information | Citizen identifies the service they wish to use, registers on the Web site as necessary and submits relevant information via online forms and e-mail | Citizen engages in an online dialogue via the system over a period of time that involves the citizen logging on several times | System intelligently guides citizen to achieve their intended goals, triggering new processes as required and proactively offers direction, advice, and suggestion |

*Table 3. The E-government Integration Model (EGI) (cont.)*

| | | | | |
|---|---|---|---|---|
| **Level of Web Site Customization** | Web site is static; there is no personalization | Limited personalization and minimal interactivity | Significant personalization, where only relevant services are made available | High level of personalization; system makes suggestions |
| **Transactional Model** | No transactional capability | Set of simple and discrete transactions limited to a particular agency | Limited set of both simple and complex transactions | Full set of both simple and complex transactions |
| **Systems Integration and Inter-agency Interaction** | No integration between IT systems | Some integration between Web and back-end IT systems within an agency | High level of integration between IT systems within the state or agency | High level of integration between disparate systems owned by different agencies |
| **E-Government Policy (e.g., security, privacy)** | None, or only ill-defined policies limited to the agency | Partial set of agency-wide e-government policies | Defined policies agreed within individual agencies | Government-wide policies providing consistent rules across all government agencies |
| **Technology Sophistication** | Web site, content management | Portal, Web-integration, back-end processing | Workflow, partial enterprise application integration (EAI) | Workflow, portal, full EAI, citizen relationship management (CRM) |

cess integrated e-government and service integrated e-government. The EIM associates e-government maturity with increasing levels of inter-agency co-operation, collaborative process engineering and tighter IT systems integration.

## Critical Success Factors

What are the critical success factors (CSFs) for e-government integration? In answering this question, a set of CSFs for IS integration was synthesized from a review of the literature (Lam 2004, 2005). Four main groups of CSF are identified, namely, strategy, organization, technology, and project. The set of CSFs was then used to as a basis for identifying the likely CSFs for e-government integration, as shown in Table 4.

## Roadmap Overview

E-government is recognized as a transformational process that progressively advances through several stages of maturity (Layne & Lee, 2001). Similarly, IS integration is not something that governments can achieve overnight, and itself is a transformational process. A roadmap for IS integration is therefore proposed, shown in Figure 1.

The proposed roadmap draws from the CSFs discussed earlier and previous work on IS integration frameworks (Lam & Shankaramanan 2004). The intended users of the roadmap are individuals involved in formulating e-government IS strategy whether at the government department level or at the central government planning level.

The proposed roadmap consists of five main iterative phases, namely (1) establish e-government needs, (2) formulate IS integration strategy, (3) integration program planning, (4) integration project implementation, and (5) organizational transition. Although the phases appear sequential in nature, in practice there will be considerable overlap and iteration.

### Stage 1: Establish E-Government Needs

E-government needs are the drivers for IS integration. E-government needs emerge from e-government strategy and objectives. For example, if there is an objective to provide citizens with online services for passport application and renewals, certain e-government needs can be derived from this objective. In addition, multiple government departments need to work together to achieve collective e-government objectives, hence giving rise to the need to establish terms of reference for inter-department collaboration. Stakeholder expectations also need to be carefully managed at this stage.

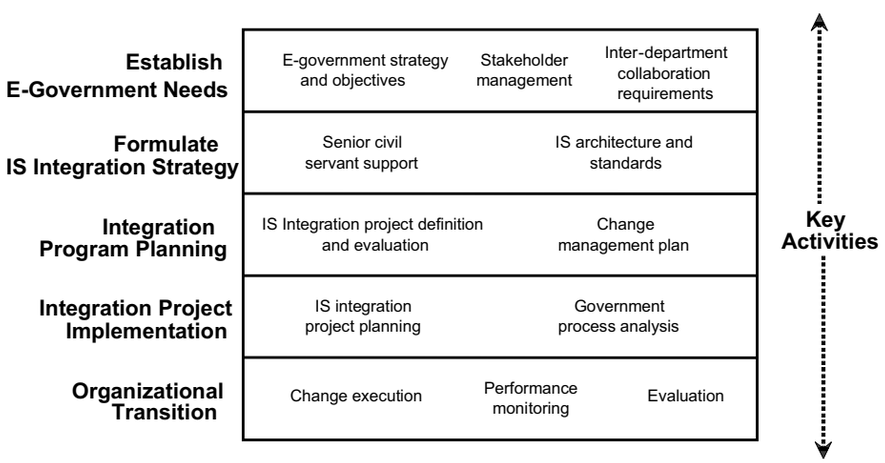
### Stage 2: Formulate IS Integration Strategy

Having understood e-government needs, an appropriate IS integration strategy is formulated. This involves choices of an appropriate IS integration architecture, and estab-

*Table 4. CSFs for e-government Integration*

| | Critical Success Factors (CSFs) in IS Integration | Likely CSFs in E-Government Integration |
|---|---|---|
| **Strategy** | Strong business case for IS integration | IS integration must be driven by the need to provide e-government services that require integration between government IS |
| | Interoperability with business partners | Interoperability between different government departments will be important |
| | Alignment with business strategy | IS integration must be aligned with e-government strategy and objectives |
| **Organization** | Top management support | Support from senior civil servants is critical |
| | Change management | IS integration will require the careful management of change within and across government departments |
| | Good organizational fit | IS integration initiatives must align with the individual goals of government departments |
| **Technology** | Compatible technical standards | Government departments must adopt compatible technical standards |
| | Handling legacy applications | Legacy government IS must be properly handled |
| | Common data standards | Government departments should agree on common data standards to facilitate the exchange of data |
| | Technology planning | Government departments should jointly plan IS integration efforts |
| **Project** | Realistic project plans and schedule | IS integration projects should have a realistic plan given resource availability |
| | Clear understanding of business processes | There should be a clear understanding of the processes used in government |
| | Client involvement, communication and consultation | Individual government departments, citizens, and other stakeholders should be closely involved in IS integration efforts |
| | Required skills and expertise | Government departments should ensure they have the right skills and expertise on board to successfully complete IS integration projects, using outsourcing strategies or external consultancies where necessary. |

*Figure 1. IS integration roadmap*



lishing certain technical standards. In some cases, a central government body may mandate the use of particular interoperability standards to facilitate the exchange of information between government departments. For example, the UK's E-Government Interoperability Framework (e-GIF) (e-Envoy, 2002) defines a set of technical policies and specifications (e.g., use of XML as the primary standard for data integration for all public sector IS) and the creation of an e-government metadata standard. Such standardization efforts require strong support and buy-in from senior civil servants.

### Stage 3: Integration Program Planning

A large number of IS will need to be integrated to meeting varying e-government needs. This falls beyond the scope of a single project, but rather a program of IS integration projects each of which is carried out as a separate project involving different stakeholders. Program planning involves defining and scoping individual IS integration projects, and evaluating them in terms of urgency and complexity. Program planning also ensures that individual IS integration projects fit together into a coherent whole and do not serve conflicting purposes or overlap in scope. Program planning also involves change management planning, and managing the impact of individual projects on existing departmental processes and organizational structures.

### Stage 4: Integration Project Implementation

At this stage, specific IS integration projects are implemented. Relevant project stakeholders will need to be identified for each project, and their expectations managed accordingly. Specific IS integration requirements are gathered from stakeholders, and more detailed project plans created as the specific scope of the project emerges. Government processes are analysed in an effort to identify process improvements that can be achieved via IS integration.

### Stage 5: Organizational Transition

The change management plans formulated earlier are put into action. Government departments migrate from existing IS systems to integrated ones. The migration process may take weeks or months, depending upon the complexity of the integrated solution and organizational mobility. Some organizational restructuring, and the definition of new roles and responsibilities, may arise as a consequence of new ways of working. The transition is supported through awareness and staff training programs. During this stage, an evaluation of new processes and new integrated systems is carried out to determine their effectiveness.

## FUTURE TRENDS

The integration of information systems (IS) becomes increasingly important as e-government matures and governments seek to offer more sophisticated online services to end-users. As such, governments will, in the future, pay greater attention to IT architectures that facilitate the integration of government IS. This includes common standards for data exchange between government IS and departments, and the adoption of interoperability standards such as XML. The use of EAI and business process integration tools is also likely to be introduced in departments where there are serious integration challenges which involve tens, and perhaps hundreds of government IS. Architectural groups spanning several government departments are also likely to emerge as it will be critical to develop integration strategies that cover multiple government departments and groups.

## CONCLUSION

The roadmap for IS integration in e-government provides a starting point for those involved in strategic IS planning, drawing attention to the need to establish an overarching framework for more detailed technical decision-making and project-specific decisions. In using such as roadmap, governments are more likely to break out of the silo mentality that has contributed much to the lack of integration in the commercial sector.

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## KEY TERMS

**E-Government:** The use of the Internet and online medium to provide government services.

**Government-to-Citizen Integration:** The integration of back-end systems with front-end applications to make government services available to citizens over the Web.

**Government-to-Government Integration:** The collaboration and coordination of processes and exchange of information between different government groups and units.

**Information Systems Integration:** The tools, methods and activities associated with ensuring that information applications work together seamlessly to meet overall business needs.

**Integration Maturity:** The extent to which processes are collaborative and technology coordinated amongst and between government groups and units.

**Process Level Integration:** The co-ordination of business processes such that they are seamlessly supported by information systems.

# Information Use–Control in E–Government Applications

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## INTRODUCTION

Within the process of globalization and the permeation of all areas of life by technology, electronic government (e-government) is becoming a powerful tool that will effectively integrate and manage the huge amount of existing information, as well as seamlessly integrating citizen interaction with its services (Abie et al., 2004). E-government is the use of ICTs in public administration in combination with organizational changes and the development of new skills, in order to improve public services and democratic processes, and to strengthen support for public policies. The concept of mobile government (m-government) refers to the use of mobile wireless communication technology within government administration and in its delivery of services and information to citizens and firms (Ostberg, 2003). Digital government is a general term which includes e-government and m-government. In this digital world the management and protection of digital information content, and the rights associated with this, from unauthorized access, use, and dissemination has been a matter of concern for many rights holders. Moreover, the protection of privacy has been a matter of great concern for many citizens.

## BACKGROUND

### Access Control In Digital Government Scenarios

When security requirements for digital government applications are considered, authorization often emerges as a central element in the design of the whole security system. Many other security requirements depend on the flexibility, trustworthiness and expressiveness of the authorization scheme. Authorization in conjunction with access control, which is the mechanism that allows resource owners to define, manage and enforce the access conditions that apply to each resource (Reuters, 2001) form the key concepts in the core of digital rights management (DRM).

Among the traditional access control models, rolevased access control (RBAC) is commonly accepted as the most appropriate paradigm for the implementation of access control in complex scenarios. RBAC can be considered a mature and flexible technology. Numerous authors have discussed its properties and have presented different languages and systems that apply this paradigm.

However, very dynamic environments with a high volume of heterogeneous data, like semi-structured data systems, DRM repositories, digital libraries, Web services, digital government systems, and so forth require more flexible constructions for the expression of access control policies. In RBAC, the structure of groups is defined by the security administrator and is usually static. The grouping of users is not flexible enough to cope with the requirements of more dynamic systems where the structure of groups cannot be anticipated by the administrators of the access control system. However, this is exactly the case in digital government applications, and especially with the secure interoperability between different governmental agencies. In such a complex heterogeneous infrastructure, the integration of new resources and the application of fine-grained dynamic policies on them is of key importance. Traditional access control schemes cannot be applied as they are usually designed for use with static infrastructures and do not scale well.

Current access control models are not appropriate for DRM and other open, heterogeneous, and dynamic scenarios because access control is often erroneously considered to apply to locations" instead of objects or resources. Because of this, it is assumed that one or a few access control (enforcement) points are used to restrict access to a set of resources in one location.

In summary, we can conclude that a different approach is required in order to solve the scalability problems of these systems, to facilitate dynamic fine-grained access control management and to provide the means to express access conditions in a natural and flexible way. Furthermore, access control models must take into account the fact that the creation and maintenance of access control policies is a difficult and error-prone activity.

The semantic access control (SAC) model (Yagüe et al., 2003a) provides an appropriate solution to the aforementioned problems, especially for heterogeneous, distributed and large environments such as digital government. As we will show later, the flexibility of the SAC model allows it to easily simulate other models such as mandatory access control (MAC), discretionary access control (DAC) or RBAC.

## Digital Rights Management Technologies

The slogan "information wants to be free" was one of the reasons why in the early days the Internet was seen as a vehicle for the free floating of ideas and information. However, in the last few years this has drastically changed since many companies have realized the Internet's capabilities and its potential as a vehicle for marketing and selling goods and services. The copyright owners of these products therefore promoted the concept of DRM. DRM is an integrated complex context covering not only technologies that limit or prohibit the unauthorized copying or distribution of these products but also includes laws, contracts and licenses that regulate and restrict the use of such material (Becker, Buhse, Günnewig, & Rump, 2003).

Rights management applies to a wide variety of systems and objects, and because of this, it is almost impossible to consider all potential application scenarios. The approach must, therefore, be developed in an open and extensible way. Reuters has proposed the development of a taxonomy of Rights and Obligations for products and services (Reuters, 2001). We think that, even in the case where this taxonomy could be built in a sufficiently complete way, its applicability in the real world might prove challenging, mainly because rights and obligations can have different interpretations in different scenarios, countries, and so forth. Therefore, we propose an open approach, based on the explicit expression of the semantics of these rights and obligations. This approach allows users to better tailor the system to their needs and their particular context.

Usually, the content industries regard DRM as dealing with the problem of unauthorized downloading of copyrighted material, a practice that costs content creators and distributors dearly in lost revenue. However, an important and often overlooked fact is that DRM is closely related to the general field of access control. Therefore, rights enforcement involves an access decision about a resource subject to intellectual property rights.

From the technology point of view DRM technologies can control resource access (number, duration, etc.), altering, sharing, copying, printing, and saving via software or hardware implementations. In the majority of the DRM approaches today not only is anonymity prevented, but the privacy of the user is in danger, since often DRM systems facilitate the profiling of users' preferences which can lead to the identification of the consumer's real identity. DRM technology in the aforementioned context is a relatively new research field that has been rapidly developing since the mid 90s, whose results are controversial (Felten, 2003). DRM solutions have been developed by several companies, but most of them are proprietary in nature. Ongoing work in academia and industry promises exciting developments in the short and midterm. However, as yet, an established, widely accepted, open DRM system for the wired or mobile world does not exist.

The amount of information produced and maintained by governmental organizations is immense and traditional mechanisms can not efficiently cope with it. That, in conjunction with the efforts to come closer to citizens and interact with them on a 24-hour basis via Internet or mobile channels, is leading us to the adoption of new models and technologies in digital government. One such promising technology is DRM, and the need for an integrated DRM framework in digital government is real. DRM is used to control and meter the huge amount of digital information generated and disseminated. In digital government DRM can be used in its classical form as well as the other way round (i.e., providing privacy rights management (PRM) for citizens).

## Classical DRM Usage in Digital Government

In its classical form DRM systems in digital government can protect governmental assets from unauthorized dissemination and enforce fine-grained policy models in connection with those assets.

## Extended DRM Usage in Digital Government

As mentioned DRM can be also used the other way round (i.e., put citizens in control of their personal information kept by the different governmental agencies and allow them to control access to that information). Transparent processing, reporting the processing, finality and purpose limitation, lawful processing, data quality and rights management are some of the components of the privacy facilitation principles in a PRM system (Kenny & Korba, 2002).

As we can see, DRM-enabled approaches can evolve to an even more general framework, protecting digital assets in general and allowing fine-grained policies to be enforced on these assets. Such assets are not confined to simple commercial content but can also be personal information (e.g., medical records), corporate information (e.g., legal documents), and so forth. Therefore DRM fits well into the context of e-government and the efforts that are taking place today in order to provide a more flexible and highly efficient e-government model capable of providing new and better quality services to its citizens, while simultaneously respecting their privacy and allowing them to have some control over it. The three aspects of DRM functionality of interest to PRM are asset creation, asset management and asset usage. Using DRM in the appropriate way (Feigenbaum, Freedman, Sander, & Shostack, 2001) to enhance the control that the citizen has on his or her data is technically possible, and appears to be a good idea. However, we should keep in mind that some problems might arise, such as heterogeneity not only in infrastructures but also in legislation, and we should remember how this is perceived by governments and their citizens.

## AN INTEGRATED FRAMEWORK FOR DRM

We have shown how DRM solutions fit into digital government. This section describes an integrated framework based on the EC-Gate Infrastructure (Maña, Yagüe, Benjumea, 2002) for DRM. The infrastructure is built upon a new access control model: the semantic access control model (SAC) (Yagüe et al., 2002), and the SmartProt system (Maña & Pimentel, 2001), complemented by the development of the rights-carrying and self-enforcing information object (SEO) (Abie, Spilling, & Foyn, 2004).

The SmartProt system is used to protect mobile software elements named *protected content objects* (PCO) (López, Maña, Pimentel, Troya, & Yagüe, 2002), which convey the content and force the user to fulfil the applicable policy before access is granted. One important constraint on the free distribution of protected information in DRM systems is that owners of the information must be able to dynamically change the access control policy. For this requirement to be fulfilled we separate the policy from the PCO. Policies are retrieved from the resource owner during the execution of the PCO and are enforced by it. The separation allows the policy to be changed dynamically in a transparent way and PCOs to be distributed and copied freely, thus enabling superdistribution.

For applications that require objects to contain the policy, there are SEOs which carry with them rights of access to and usage of their own operations, services and content, and are responsible for enforcing these rights, while at the same time preserving their confidentiality and integrity, as well as users' privacy. This solves the problem of how to enforce securely rights of access to, and usage of, ubiquitous information in an environment characterized by equally ubiquitous malicious code. The SEO as a mobile agent is a particularly interesting technological concept because of its many and varied capabilities. SEOs are in fact so versatile that they can be made to combine, filter, index, rearrange, interpret and transform digital information (XIWT, 1997).

The EC-Gate infrastructure provides different tools to control the entire life cycle of the digital content: protection, management, distribution, and commercialisation. When a new piece of content is incorporated into the system it is encapsulated into a PCO, or a SEO that protects the contents and enforces the execution of the corresponding access parameters (access control criteria and, optionally, associated actions such as payment, notification of access, etc). Both access control criteria and actions are specified using the *Semantic Policy Language* (SPL)—which is part of SAC, and are supported by automated tools.

An important complement to the SAC model is the operation of several independent authorization entities providing attribute certification services. The identification of the user is not mandatory, so users' privacy is not threatened. The client possesses a set of attributes, and access control to resources is based on the specification of a set of attributes that the client has to present in order to gain access to them. For interoperability and security reasons, client attributes must be digitally signed (in the form of attribute certificates) by trusted certification authorities. The independence of the certification of attributes is the key to interoperability because it allows attributes to be safely communicated, avoiding the necessity of being locally emitted by the system administrator. For this approach to be secure, a mechanism to establish trust between these access control systems and the authorization entities is necessary. In this context, mechanisms for the integration of an external privilege management infrastructure (PMI) supported by

semantic information about the certification entities have been developed (Yagüe et al., 2003b).

In summary, the EC-Gate infrastructure represents a flexible solution for different distributed scenarios and any kind of content, solves the originator-retained-control problem, can be applied regardless of the attribute certification scheme, implements distributed access control management and enforcement mechanisms, and allows dynamic modification of policies transparently and efficiently. Therefore, we have taken it as the robust core for our integrated framework for DRM.

## FUTURE TRENDS IN THE APPLICATION OF DRM IN DIGITAL GOVERNMENT SCENARIOS

In the process towards successful digital government, the correct handling of privacy, security and trust is an indispensable precondition for reliable legal safeguards, reliable technology, and secure business, and for achieving acceptance by citizens. A DRM system can enable governments and other organizations to protect digital assets and control their distribution and usage, thereby protecting intellectual property rights (IPRs) over digital information. Furthermore they increase security, trust and privacy throughout the entire value chain from producer to distributor to consumer. Therefore the digital government area would benefit from DRM as it can provide digital policy and risk management that can facilitate the automation of digital government activities. It can enable government to make a large amount of information available electronically in a secure and controlled manner, which will open new opportunities and improve services to citizens. It can also enhance the enforcement of IPR, which can encourage the production of digital products and services (Abie et al., 2004).

DRM is important for a number of digital government services, among which are the certification of permissions, the certification of existence and identity, and the administration of welfare services, healthcare, education, telecommunication and broadcasting services. DRM is capable of doing electronically what was once done manually on paper forms. A DRM system requires persistent content protection so that content cannot be used and redistributed illegally. The content is protected during delivery and restrictions of the content usage rights are maintained after the content is delivered to the end user. As a result the required security level in DRM systems goes beyond simply granting digital licenses to authorized users. This means that the protection has to stay with the content, and that end-to-end security has to be maintained (i.e., every link in the delivery chain has to be secured and content must only be accessible to authorized/authenticated persons or compliant devices). That is, rights must be correctly executed and enforced. The focus of the Open Mobile Alliance[1] (OMA) on the development of mobile DRM service enabler specifications, which support the creation of market-driven, interoperable, end-to-end mobile services, is evidence of the importance of mobile DRM applications.

Our DRM solutions, described above, will thus benefit and enhance several digital government services, for example m-healthcare, m-education and m-entertainment.

### M-Healthcare

The healthcare and welfare sector is one of the most crucial application domains. The misuse of medical records can have severe consequences for patients. Their misinterpretation can lead to incorrect medical treatment which may be detrimental to the health of the patient, or even lethal. Therefore it is more important than ever to protect all types of digital medical data—image, audio, video, and so forth. Thus, our DRM solutions can be a great boost to mHealth since they protect both the privacy and the integrity of medical data, while at the same time making them easily and quickly accessible to health service personnel on the basis of fine-grained access control policies.

### M-Education

Our DRM solutions can boost m-education by facilitating the easy and secure management of the creation, retrieval, trading and distribution of online learning objects and by supporting secure collaborative development. However, promoting the exchange and reuse of quality learning objects, and respecting intellectual property and rewarding the various contributors, are the two key issues which have to be dealt with before mEducation can become cost effective.

### M-Entertainment

Using our DRM solutions, digital information, such as music, can be offered to consumers via a virtually limitless range of business models, such as sale of downloads, subscriptions, pay-per-listen, super-distribution, and so forth.

The aforementioned application scenarios are necessarily underpinned by a large number of supportive services, for example securing government documents, protection against loss of data, securing handheld device

access to government networks, the deployment and management of security policies for many mobile devices, roaming services, and so forth.

## Securing Government Documents

The security of every document sent and received within the government network must be guaranteed, for example by digital signature alone or in combination with encryption. Our DRM solution in the form of PCOs and SEOs can provide government departments with the ability to secure documents from device to desktop, or user to user as well as on the server, since PCOs and SEOs are protected and self-enforcing objects respectively.

## Protection against Loss of Data

By virtue of their portability and small size, personal digital assistants (PDAs), Smartphones, and other handheld devices are easily stolen and lost, which means there is a constant risk of the data stored on them falling into the wrong hands. The installation of PCOs and SEOs on every mobile device will ensure that all sensitive information is encrypted and locked, and thus inaccessible to unauthorized, inquisitive individuals.

## Securing Handheld Device Access to Government Networks

To reap the full benefits of a mobile workforce, government agencies must ensure the security of network access to their corporate applications from handheld devices. The installation of PCOs and SEOs on mobile devices also ensures secure connections between wireless devices and the government network, which ensures that the critical information of any agency is protected against unauthorized access and use.

## The Deployment and Management of Security Policies for Many Mobile Devices

When a variety of handheld devices are being used within governmental agencies, an easy and fast way to set up security policies on each device is essential. The use of SEOs and PCOs makes it possible to bind an object to an external policy and/or to insert the policy into it. Policies can be tailored to the exact and specific needs of a specific item, and be associated exclusively with that item rather than cluttering up the whole system. The functional repertoire of an object can easily be extended and the carried policy modified accordingly (i.e., to reflect new or changed behaviours) (Payette & Lagoze, 2000), and access conditions can be set independently of the distribution point (Lopez, Maña, Pimentel, Troya, & Yagüe, 2002). Different policies can be easily created for different users, as well as for the different devices.

## Roaming Services (Technical, Network, and Information Roaming) (Ostberg, 2003)

PCOs and SEOs are mobile and can, by virtue of being comprehensive units, be managed over time by their creators or providers instead of system administrators. Their self-contained and self-protecting nature means they play an important role in the development of mobile ambient intelligent services. There are those who contend that self-protecting container technology can support almost any type of network topology with any number of participants, and that it controls rights flexibly, which means that it is an appropriate tool for super-distribution (Yan, 2001).

# CONCLUSION

It is obvious that the control of the dissemination of information in digital government applications will be of crucial importance in the near future. Access control and authorization will have to be enforced in a dynamic, distributed and flexible way within the context of the huge amount of information generated by digital government. Therefore we propose the use of a flexible and integrated DRM framework that is capable of protecting content and sensitive information in a fine-grained way and, at the same time, respecting citizen's fundamental rights of personal privacy. This will enable digital government to provide more intelligent and flexible services in future scenarios while, at the same time, allowing citizens to control their personal information assets.

DRM is already a fact in the wired world, and will be deployed in e-govenment. However, in wireless communication between e-government and citizens and other external entities, mobile DRM will gain momentum. Mobile phone penetration is generally around 50% (Hobley, 2001), and even above 80% in some countries. This in conjunction with a high-speed third-generation (3G) and beyond mobile infrastructure, which is already in place, will result in the deployment of digital government services to citizens via wireless media. Thus, m-government will materialise and mobile DRM solutions will be of key importance (Beute, 2005) in the near future.

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## KEY TERMS

**Access Control:** Prevention of unauthorized use of a resource, including the prevention of the use of a resource in an unauthorized manner. This means that there will be a limitation of the flow of information from the resources of a system to only authorized users.

**Attribute Certificate:** A data structure, digitally signed by an Attribute Authority, which binds some attribute

values to identification information about the holder of the attribute.

**Authorization:** Granting of rights, which includes granting of access based on access rights or privileges. It implies the rights to perform some operation, and that those rights or privileges have been granted to some process, entity, or human agent.

**Certification Authority (CA):** A trusted organization that accepts certificate applications from users, authenticates applications, issues certificates and maintains status information about certificates.

**Digital Rights Management (DRM):** Refers to techniques and tools for managing and controlling the access to and utilization of digital assets. Related to the application of DRM techniques to the privacy-relevant information of users, the concept of privacy rights management (PRM) has recently been proposed.

**Mobile Ambient Intelligence:** This refers to digital mobile environments in which digital services are sensitive to people's needs, tailored to their individual requirements, anticipatory of their behaviors and responsive to their presence.

**Privilege Management Infrastructure (PMI):** The infrastructure that supports the management of privileges in support of a comprehensive authorization service and in the context of a public key infrastructure.

**Public Key Certificate (or Identity Certificate):** A data structure, digitally signed by a Certification Authority, which binds the identity of a user to his/her public key.

**Public Key Infrastructure (PKI):** A process for issuing public key certificates, which includes standards, certification authorities, and communication between authorities and protocols for managing certification processes.

**Source of Authority (SOA):** An attribute authority that a privilege verifier for a particular resource trusts as the ultimate authority in assigning a set of privileges.

# Informational Literacy

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## INTRODUCTION

Digital divide is a metaphorical division which separates those citizens who can use new technologies to their own benefit from those who cannot. Digital divide is one of the biggest dangers to consolidation of a harmonic development of the information society.

Historically, projects are mostly centered on helping people that, either for economical or geographical reasons, are not able to have a computer or do not have the possibility to connect that computer to the Internet. Without any doubt, part of the solution resides in creating new telecommunication structures, but that is not the whole solution. There is more in e-inclusion than giving away computers and putting out more fiberoptics. Digital divide is a multidimensional phenomenon which includes lots of different drawbacks. A great many of them are mental in essence, so they can be avoided through education.

The theoretical basis for this approach is to a great degree inspired by the work of the economist Amartya Sen. In Sen (2001) there is a distinction between functionings and capacities. Functionings are elements of technical knowledge towards making something specific, for example, the technical details of sending an e-mail. On the other side, capacities are those pieces of knowledge which include action and social recognition, for example, to arrange a political demonstration using e-mail facilities.

The approach against digital divide which does not stop in the infrastructure, does not go any further than the functionings. That is, learning projects which teach the "four pillars" of computer use: Web browser, e-mail client, word processor, and digital spreadsheet. This is by no means wrong, but it is clearly not enough. Any approach towards diminishing the digital divide must take the theoretical approach described by Sen and work toward capacities, not just functionings.

Digital literacy should not only be about functionings, but about capacities. The final aim of a literacy and ICT campaign should be to give empowerment to the users, not only the technical knowledge of how to send e-mail to buy tickets through a Web site.

By the time this article was written (2005) there were no clear politics going beyond the functioning issues. There are good policies in the US and the EU about "critical thinking", for example, but almost no policies when the application of such curricula is to be used. National politics, in different European countries as well as in the U.S., is mostly centered in teaching the so-called "four pillars": basic communication and ofimatic issues. Most countries develop such courses with no further worries in segmenting the target, so everyone (the elderly, women, migrants, and young people) get the same basic courses with the same professors. An important exception are the pilot projects co-financed by the European Union from programs such as e-learning, Leonardo, or e-content, which do insist on the need of segmenting the targets and find novel ways to approach them. One example is using mobile phones instead of computers to reach teenagers better. Another interesting concept, which may seem to become a major trend in the EU in the following years, is the development of the e-porfolio: a way in which students collect all the relevant information and experience for work and are able to present it using this digital format.

Unfortunately, there are not clear policies yet, and the efforts towards informational literacy are in the hands of either individual researchers or social workers who want to go beyond those four pillars. For example, such a basic element as an informational literacy test has not even been implemented on either a national or European level. Some American universities have created a quite complete one, but it is neither standardized nor nationally distributed. The same can be told about e-portfolios today. Different universities in the EU and the U.S. have their own system and there is not such a thing as a common framework on e-portfolios which everyone can use.

## BACKGROUND

As stated in the introduction, most pedagogical efforts have been directed towards the teaching of functionings. This is the necessary part we need as background to move to a more informational and cognitive type of learning.

Before arranging the contents of the course, a general model specifying the relationships between students and professors is needed. Here we will follow the model developed by the Center for Technological Capacity of Extremadura (Spain) (Equipo Técnico Aupex, 2003), which

is a good example of an advanced digital literacy course based mostly on functionings:

1. **Personal Contact:** Specially directed to avoid the initial fear that the students may have towards ICT.
2. **Seduction:** To show ICT as something attractive in order to stimulate the desire to learn. The mere description of how important ICT is for finding a job and how difficult a world without ICT skills would be usually Is not enough. As a matter of fact, these explanations of ICT use may de-motivate.
3. To teach how to use the different tools, also trying to involve its use in other activities, not directly related to ICT, like making a fanzine.
4. **Compromise:** To turn the student into an active subject in the learning process. The key word here is "collaboration". Advanced courses for digital literacy are based on the paradigm of "collaborative learning" as described, for example, in Bruffee (1999).

This naturally leads to the division of any digital literacy course into three main phases:

1. **Motivation:** Trying to find common interests among students in order to arrange the contents of the course instead of teaching mere functioning without any references to specific tasks.
2. **Capacitation:** The phase when the instrumental knowledge is taught: how to use the hardware, the operating system, and its associated software.
3. **Organization:** To teach how to work in teams on a common project so students can learn from each other, and the learning is associated with the social and cultural reality to which students belong.

That said, there are some issues that should be covered before arranging the informational literacy course. We have to be sure that our students are confident in all of the following areas. As we said before, we are not assuming that functionings are not necessary. Before gaining more proactive abilities that lead to capacities, the following abilities should be taught first.

1. Knowledge of the hardware and the physical structure of networks. This includes, as well, the basic knowledge related to hardware:
   - To turn on and off a computer safely
   - How to properly use the mouse
   - Introducing and removing floppy-disks, CD-ROMs, and DVDs
   - Recognizing the main elements inside a computer, once opened
   - It also includes teaching the basic knowledge about connections: (a) ow to connect and disconnect several computer elements: screen, keyboard, mouse, and so on; (b) how to safely connect peripherals like printers, scanners, and modems; (c) how to connect and synchronize external devices to store information such as pen-drives, mobile phones, and PDAs, and so forth.
2. Knowledge of the logical structure of software. This includes:
   - Basic use of the operating system.
   - Creating folders, moving, copying, and erasing documents.
   - Installing and uninstalling software.
   - Using the Internet browser, understanding what a URL and a hyperlink are, downloading documents and programs, and a very basic introduction to HTML.
   - Concept and main uses of search engines.
   - Using e-mail, basic functions of the e-mail clients, and anti-spam filters.
   - Introduction to other ICT simple applications such as chat programs, P2P networks, online forums, simple tools to publish Web pages, and so on.
3. Familiarity with the ICT vocabulary.
4. Functionality of software.
5. Ergonomics and security.
6. Ethical and social implications of ICT

## INFORMATIONAL LITERACY: THE MAIN STEPS

These are the main elements that have to be considered to arrange an informational literacy program, project, or course that has given capacities (empowerment) as its central aim.

### Acknowledge the Need for Information

This first step implies creating attitudes. Following Bruce (1994), the first characteristic that defines an informationally savvy person is the ability to learn in an independent and autonomous way. Therefore, the first characteristic we need to teach is the right attitude; instead of depending on other people to search, download, and install programs, we need to motivate an autonomy approach instead.

### Identifying the Proper Information Sources

Once the students know they need the information and develop a "I will find it myself" attitude, they need to know

where the information can be found. According to Doyle (1992), the following are needed to create this attitude:

- Recollection of precise and detailed information before making decisions.
- Internalization of the potential sources of information.
- Knowledge of who to ask and which questions they must ask in order to get the information they are looking for.

## Search Strategies

The first step is to show that everybody has an individual style of searching and surfing for information and that there is no magic solution to finding it. Therefore, professors should not just explain their personal styles, presenting them as the best, but must offer a series of different possibilities instead, showing that there is always more than one way of reaching the same end. A good theoretical approach to that subject can be found in Kuhlthau (1993).

As the title indicates, professors must teach strategies, not rigid recipes. Among those strategies, we should indicate the following concepts:

- Describing search engine syntax. A good and practical book to help with this is Calishain and Dornfest (2004).
- Listing specialized portals, based on the motivations and needs of the students, in order to assure capacities development and therefore, empowerment.
- Informing how questions must be delimited find needed information.
- Avoiding "trap expressions" such as "image", "MP3", or "free", which when included in a search will probably lead the user to porn or crack pages, and the user will get some sort of spyware installed.

## Locate and Retrieve Relevant Information

The student needs a strategy to browse through all the information picked up, refine it, and eliminate what is not needed until only the desired info is processed. Again, we need to show that there are several ways of doing that, as a magic recipe for all does not exist.

It is also important to teach the students how to store and label the information found in order to retrieve directly from their computer next time the piece of info needed. It is important to fight the usual fashion of saving anywhere the document we found, leaving it the same name, or the obsession to collect documents, making the students to ask themselves first whether they will need that information later or not before saving anything.

## Critical Evaluation of Information

Critical evaluation of information is one of the key capacities when talking about informational literacy, and it is very seldom taught in digital literacy courses. Critical thinking is a vast subject which cannot be covered here. However, there are some hints of critical thinking related to the Internet which are usually of great help in arranging a digital literacy program. A good description of what critical thinking is, its normative nature, and its importance in the learning curriculum can be checked in Bailin and Coombs (1999).

1. Not everything that shows up on the Internet is true. Newcomers tend to see the Internet as an edited media, like newspapers or TV. "It must be true, I saw it on the Internet", is still a common saying among newcomers.
2. Understand the usual structure of an argument. What are the premises, argument, and conclusion? When is an argument valid? Note typical argumentation structures (Giere, 1997).
3. Be able to detect fallacies, both formal and informal (cf. Weston, 1987).
4. Go beyond one's prejudices and to accept retrieved information that goes against our own beliefs in an objective manner.
5. Do not get just one version of the story, but several.
6. Properly understand the concept of contrasting information and whether it is trustworthy or not. Avoid appeals to authority. Trust more information that comes from a professional organism than casual information found on the Net, from someone without qualifications.

This can be taught practically, arranging information gathering exercises, such as:

- Asking the students to search for information about a subject within Webs from a very different ideological orientation, and ask them to evaluate which info looks more trustworthy and why.
- Asking students to find reports, articles, and papers on a subject about which they have a very specific and strong opinion. These articles and papers should maintain a very different position.
- Using April Fool's jokes, badly written texts, urban legends and so on, which are very easy to find on the Net, teach them the need to verify information.

## Creation, Presentation, and Communication of Information

This is probably the least developed aspect of digital literacy courses. It is as if the main task of educators finishes when students know how to find the information. However, this is not true. It is also needed to analyze the information the students have found, to know how to interpret it to produce an abstract out of it and, especially, to adapt that information to their own uses and needs.

We are talking, therefore, about teaching critical analysis of information and related activities such as text analysis, composition, and other more humanistic instruments. Following Burke (1995), we have compiled the following activities which we consider key:

- **Discourse Analysis:** Being able to get any text, divide it into parts, recognize the main arguments inside, and produce an abstract of the main ideas.
- **Development of Argumentative Structures:** Being able to recognize the type of structure that a specific problem needs and also able to know which prescriptions and recommendations are associated to the stylistic formulation which better suits the material.
- **Relevance in the Sperber and Wilson (1986) Sense:** Being able to transmit the maximum amount of information with a minimum cognitive effort from the reader. That means, from a practical application of Sperber and Wilson theory, to find an equilibrium between texts excessively embellished and linguistically complex and texts that may be too practical and synthetic (i.e., hard to understand).
- **Heuristics to Compile the Needed Arguments:** Know what is relevant and works properly in our final synthesis and what may be curious but goes beyond our main aims.
- **Studying Heuristics:** Information does not become knowledge unless it is finally stored in our minds. We need to give some general instructions on how to arrange the process of studying a certain matter. This is specially true in a digital literacy framework, where pupils will probably not be professional students.
- Use of rhetorical figures in order to make text more interesting: Having a basic grip of the main rhetorical figures (comparison, metaphors, synecdoche, analogies, metonymies, and so on) to produce texts that are more interesting to read. The idea, of course, is not to make a literary workshop. The professor's main aim must be to present how rhetoric is connected to relevance, and how rethoric has interesting cognitive effects which may improve the understanding of the text. Another interesting reference here is Lakoff and Johnson (1980).

Besides these more "classical" abilities there are others more related to ICT. Following Bonsiepe (1995), here is the main list of abilities which must be taken into consideration:

- To localize, select, and divide information visually, in order to create coherent and cognitive presentations of what we want to say in a multimedia format.
- To know how to transduce information to a visual format. This implies both an instrumental presentation (to know which program we need to use, and how to use it) as well as content knowledge (which visual format we want to use and why.)
- To understand the interaction between language, sound, and image within a temporal dimension.
- To learn the basics of computer software to digitalize images, sounds, and text.
- To have a mental model of the main characteristics and uses of the different elements which compose perception (color, textures, size, orientation, contrast, transitions, rhythm, etc.).
- To understand how visual rethoric is used in graphic design and marketing.
- To have general knowledge to test the communicative efficiency of our proposals.
- Ability to coordinate projects in a multidisciplinary manner.

## Ethical and Legal Use of Information

There is a lot of material to teach here, and intuitions can be deceptive sometimes. The important thing is that professors show students different positions in a coherent manner. For example, when discussing questions like peer-to-peer networks, they should not just present the piracy menace, but also talk about other conceptions of copyright, as argued in Lessig (2004). Their concepts describe free software, Linux, and initiatives related to creation and distribution of cultural products, such as Creative Commons. On the other side, one has to fight the tendency to "sell" ICT as a means to obtain copyrighted material for free. This is one of the few subjects about ICT that digital literacy students are probably aware of. We must try to give some legal indications about the importance of respecting copyright, and not only music and movies, but also still pictures (the associated right of the portrayed person to decide whether the picture can be used or not) and other copyrighted material which a great many people do not know have property rights, such as typefaces.

## FUTURE TRENDS

Informational literacy is a new field that has grown recently as both educators and governments realize that literacy based only on functionings is not enough to guarantee a proper entrance into the information society for all.

One of the future trends, as can be seen in Jacobson (2000), for example, is a greater interdisciplinary influence between the field of informational literacy and the design and architecture of information. In its preliminary status, following the classic tendency of "re-mediation", that is, starting the development of analysis of new media using and adapting the structures already existing for older media as described in Bolter and Grusin (2000), the first steps of informational literacy followed very closely by the methodology used for textual media. Again, this approach is necessary, but hardly sufficient, considering all the new and complex possibilities that new media offer. Therefore it should be expected that informational literacy applied to ICT will become more and more visually oriented in the future.

Another emerging trend, clearly growing stronger, is informational literacy for excluded people. Certainly, everybody will find informational literacy useful. However, when we consider excluded people, it is clear that the effect of digital literacy among them will be a lot greater. As a simple example: to us, a Web site like the Gutenberg project, which offers us classical texts for free, is more or less relevant. However, we can also go to a bookstore and buy it. Nevertheless, for a person that is economically handicapped or is at a remote location where bookstores are too far away, having a virtual library at the touch of their fingers is a very relevant alternative. Tendencies show even now how social educators are moving more and more towards ICT teaching for the excluded people when they realize all the empowerment options they offer. This is a tendency which will clearly grow in the future.

## CONCLUSION

Digital literacy goes far beyond the teaching of ICT functionings. They are certainly necessary to assure the proper use of ICT technologies but are not by any means sufficient. If we want to have real citizens in the Society of Information and no mere consumers of digital entertainment, we need also to teach capacities: that is, ways by which citizens can empower their lives, by being able to connect all the formal possibilities that ICT can offer them for their own real needs and desires.

To do so, we need to pay closer attention to informational abilities related to ICT, not just the technical protocols of using them. The main informational abilities needed for such an objective are to acknowledge the need for information identifying the proper information sources, teaching basic search strategies, to locate and retrieve the relevant information, critical evaluation of information, how to create, present and transmit information, and ethical and legal approaches to information.

The two more meaningful future trends one can see right now are the combination of the disciplines of informational literacy and information design, creating a more visually based approach to information in the ICT context, and the development of specific informational courses for excluded people to improve their lives and fight their social exclusion.

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## KEY TERMS

**Creative Commons:** A non-profit organization which has as its main aim is to develop a new standard for cultural products, in which the authors have more freedom to decide whether other users can use their own creations in new projects and under which restrictions. More information is available at www.creativecommons.org

**Critical Thinking:** Both a way of thinking and of teaching, in which we try to evaluate information, and decide whether we can trust it or not, forming our own judgments and decisions based on that information. Important parts of informational literacy processes are based on critical thinking issues.

**Digital Divide:** A popular term used to describe the perceived growing gap between those who have access to and the skills to use ICT and those who, for several reasons have limited or no access. Causes vary from socioeconomic status, gender, age, place of living, and so on. One of the main concerns related to this issue is how digital divide can actually amplify socioeconomic or gender discrimination, making barriers even greater, as we move to an information society.

**Digital Literacy:** A blanket expression referring to all the knowledge one must have in order to use computers properly. Therefore, digital literacy should include both instrumental and informational issues. However, it is commonly used only to refer to the first type of issue.

**Information Design:** An interdisciplinary science that searches how to properly design books, interfaces, Web sites, and so on, in order to make them easier to interact with and easier to obtain the information we are looking for.

**Informational Literacy:** A series of competences that a computer user must have in order to be able to obtain, use, and reapply the learned information. Informational literacy presupposes instrumental learning in order to be able to use the computer.

**Instrumental Learning:** A series of competences that a user must have in order to be able to use a computer. We use the term "instrumental" to indicate that we are only considering formal characteristics of how to use a computer, from the ability to turn it on and off, and send an email, with no references on how to process the information we obtain.

**Remediation:** A term invented by Bolter and Grusin in their book with the same title to refer to the fact that when developing projects with new media, authors do not work from scratch, but tend to base their work from older media, using techniques, conventions and topics from older media, transposing them to the new media, that is, remediating them.

**Search Strategy:** To have a certain algorithm to look for a specific piece of info, as opposed to a random surf on the Net or putting some related words in a search engine, but with no precise model in mind as to what we are looking for and why we choose those words.

# Innovative Local E-Government through the PEOPLE Project

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## INTRODUCTION

PEOPLE, one of the most important e-government projects in Italy, was created in 2002, when it was ranked first among almost 400 projects submitted to the Italian government according to its Piano di Azione per l'E-Government, literally, E-Government Action Plan, that is, the program to which the Italian government allocated around •120 million to finance various projects on e-government development. The financial contribution for each project did not exceed 50% of its total expected budget.

The name of the project is the acronym for Progetto Enti Online Portali Locali E-Government, literally, Project Public Bodies Online Portals E-Government.

The purpose of PEOPLE is "to innovate and to simplify the relationships between Local Public Administrations and citizens" through the online delivery of almost all the services provided by local bodies, leading to the fulfilment of 95% of individual and company requests. The project seeks to create a multichannel network system with a Web portal as the main method of access and interaction.

## BACKGROUND

PEOPLE is supported by 55 Italian local authorities from 12 different regions. This group includes both metropolitan areas, like Rome and Florence, as well as small municipalities. The developers of the project therefore had to create a model that was sufficiently abstract to fit all the different contexts, irrespective of local legislation or regulation.

The total population administrated by PEOPLE amounts to 7.5 million, almost 13% of the entire Italian population.

The main reason these administrations were involved in the realization of PEOPLE is the high level of organizational and technological capabilities required. These bodies are the most dynamic in the country and represent best practices as concerns service innovation. This makes PEOPLE a sort of laboratory in which the most innovative Italian local authorities are sharing their experiences and their know-how. To this end, the PEOPLE administrations are organized in a federal model, in which every single municipality has the opportunity to participate in the creation of each single service. The choice is to preserve and enhance cultural diversity by creating a set of solutions based on a common structure and on a shared standardized platform.

The model is equally participated in by every single local authority and is built on the exchange and integration of information; the goal is to promote the sharing of services and solutions that may have been produced locally before the project started or created ad hoc. However, those solutions must be the same for each single participant and for each citizen who wants to use the solution proposed by the project. Consequently, an extremely high level of coordination is needed to make this model work, and this is one of the most critical points that PEOPLE had to face. In order to overcome this problem, the PEOPLE staff created an original management organization based on an efficient, high-tech communication system.

*Figure 1. The areas involved in PEOPLE (Progetto PEOPLE)*

*Table 1. The local government authorities involved in PEOPLE (Source: Progetto PEOPLE)*

| Local Government Administration | Citizens | Region |
|---|---|---|
| Comune di Ancona | 100,409 | Marche |
| Comune di Bari | 347,106 | Puglia |
| Comune di Bologna | 378,356 | Emilia Romagna |
| Comune di Bolzano - Stadtgemeinde Bozen | 97,317 | Trentino Alto Adige |
| Comune di Brescia | 195,442 | Lombardia |
| Comune di Carpi | 62,104 | Emilia Romagna |
| Comune di Cesena | 90,851 | Emilia Romagna |
| Comune di Cremona | 71,321 | Lombardia |
| Comune di Falconara Marittima | 28,307 | Marche |
| Comune di Firenze | 374,000 | Toscana |
| Comune di Genova | 627,599 | Liguria |
| Comune di Jesi | 39,238 | Marche |
| Comune di Mantova | 48,341 | Lombardia |
| Comune di Modena | 176,965 | Emilia Romagna |
| Comune di Paterno Dugnano | 45,661 | Lombardia |
| Comune di Parma | 170,541 | Emilia Romagna |
| Comune di Pesaro | 90,000 | Marche |
| Comune di Piacenza | 95,594 | Emilia Romagna |
| Comune di Ravenna | 140,933 | Emilia Romagna |
| Comune di Reggio Calabria | 179,412 | Reggio Calabria |
| Comune di Reggio Emilia | 148,517 | Emilia Romagna |
| Comune di Roma | 2,665,000 | Lazio |
| Comune di San Benedetto del Tronto | 45,368 | Marche |
| Comune di Sesto San Giovanni | 81,482 | Lombardia |
| Comune di Siena | 54,344 | Toscana |
| Comune di Trapani | 69,700 | Sicilia |
| Comune di Venezia | 274,168 | Veneto |
| Comune di Verona | 258,372 | Veneto |
| Comune di Vigevano | 59,302 | Lombardia |
| Comune di Malo | 12,366 | Veneto |
| Comune di Schio | 37,662 | Veneto |
| Comune di Tiene | 21,107 | Veneto |
| Comune di Santorso | 5,305 | Veneto |
| Comune di Torrebelvicino | 5,516 | Veneto |
| comune di Valdagno | 27,136 | Veneto |
| Comune di Arzignano | 23,454 | Veneto |
| Comune di Chiampo | 12,251 | Veneto |
| Comune di Marostica | 12,823 | Veneto |
| Comune di Pianezze | 1,839 | Veneto |
| Comune di Nove | 4,901 | Veneto |
| Comune di Schiavon | 2,339 | Veneto |
| Comune di Marano Vicentino | 8,902 | Veneto |
| Comune di Villaverla | 5,384 | Veneto |
| Provincia di Bologna | 926,744 | Emilia Romagna |
| Unione di Comuni “Caserta Sud-Ovest” | 139,534 | Campania |

## THE SERVICES PROVIDED

PEOPLE will provide a wide range of services concerning every single life event, as defined by the Italian government. Once the project is completed, there will be around 180 services divided in five groups:

- local tax services,
- grant and authorization services,
- geographic information-system services,
- social and welfare services, and
- register-office services.

Besides these, an efficient online payment service and a reliable registration and authorization system have been created.

Some general services are also planned, such as online ticket reservation and sale for events like exhibitions or concerts, virtual community services, and online document access.

All these services have been developed in the project itself by a well-organized division of labour between the local administrations involved. Each area has been managed by a single administration, which, without regard for the indications from the other authorities, was responsible for the development of all the services in the area.

So far, the project has developed some demonstration services, such as the change-of-address (within the same local area) or the Building Start-Up Certification (Decuncia Inizio Attività, DIA) initiatives to illustrate the technical functionalities of its software.

## THE SOFTWARE

As stated above, PEOPLE is both the project and the aggregation. However, there is yet another interpretation; PEOPLE is the software through which each municipality will provide services to the citizens. The major benefits expected from the use of this software are the following:

- decrease in the development costs for online services;
- means to manage the complexity of e-government-related issues through coordinated and integrated investments; and
- the possibility for small-size local administrations to benefit from low-cost products and solutions provided by other PEOPLE administrations.

Each service comprises several data forms structured in different fields to complete. In order to validate the data provided, the system acts as follows:

- verifies each single word syntactically;
- marks submitted forms, ensuring that all the compulsory fields have been correctly completed; and
- validates and cross-verifies all the data after completion.

Citizens will be free to fill in the forms in any order before signing and sending the request. However, the order of the pages will be defined by the system, which will also take control if a page may not be needed (e.g., as the data has already been provided) or will block the access (e.g., depending on a user's access level as a requester, delegated, or technician). The user will be able at any moment to interrupt the procedure, save the inserted data, and return later to complete the request.

PEOPLE will also allow citizens to sign both the request and any attachment (any kind of document) digitally. In some cases, for example, the DIA, more than one person must sign the documentation, and the process above can be quite complex. PEOPLE will also guide users in this process, identifying the documents that will be needed to be signed and who is supposed to sign them. Citizens will be able to notify the local administration of people authorized to act as their proxies. Each proxy created by a citizen will be valid only within a specific local government area for a specific service and for a specific period of time.

After all documents are completed and signed, the requests will be sent to the local government through a certified e-mail system. The local government officials will receive in a special in-box an e-mail of notification with a link to the citizen's request from the certified e-mail system. This message will contain the text of the main form and all the attachments. Once the message has been read, the e-mail system will request the official to sign a receipt that will be sent to the requesting citizen.

Citizens will also be able to consult their current personal proceedings management page at any point in the application. This page will contain all the forms that have been completed, those that have been temporarily saved, and all the forms awaiting completion from the competent local authority. In the last case, the progress status will also be shown.

PEOPLE has been planned to send the requests to the local administration's back-office system directly. This operation will be started when the legislative and organizational conditions for the automatic reception of requests has been introduced.

## PEOPLE 1.0 FRAMEWORK: THE REFERENCE IMPLEMENTATION

The PEOPLE 1.0 framework is the first version of the project released to allow municipalities to test the results obtained so far and to develop services and systems to link between the online front office and the back office. For this, the virtual service layer of the PEOPLE 1.0 reference implementation is required. This framework has been realized on a vendor-neutral basis in order to guarantee full accessibility and compatibility with the services developed by different ISVs (independent software vendors) in a service-oriented environment.

The framework uses J2EE (Java 2 Platform Enterprise Edition) technologies and components extensively, looking for the latest specifications and standards in Web-service technology provided by the Ministero per l'Innovazione e le Tecnologie, literally, the Ministry of Innovation and Technology, the body responsible for information and communication technology and high-tech development in Italian public administration.

Through this, PEOPLE can achieve the following:

- Allow software vendors to realize online services quickly, using the same patterns and development techniques
- Achieve the same look-and-feel experience for all online services, so standardizing the user experience
- Support the integration and certification of the online services provided by the project and guarantee compliance with architectural standards

The People framework is structured in three layers:

- The front-end layer includes the services based on a multichannel access system, a light work-flow engine used to manage user interactions, and a Web service ensuring interoperability with the other layers of the Web-service-layer and with external calls (i.e., interoperability with other domains).
- The people layer comprises the management components (the so-called PEOPLE console) and the service components (PEOPLE services).
- The back-end layer consists of Web services that answer the front-end requests and interact with the back-end systems.

As a reference implementation, the PEOPLE framework was developed and tested in the Centro di Itegrazione e Collaudo, literally, the Integration and Testing Center, which was created by the project in close collaboration with Enterprise Digital Architect, the private company that works as a technical partner of PEOPLE, in order to certify the correspondence to all PEOPLE requirements and its full usability.

The reference implementation uses vendor-neutral components in a vendor-neutral environment and cannot therefore satisfy all requirements of a given production scenario. These requirements could be trustworthiness, performance, scalability (clustered environments), fault tolerance, or recoverability (what happens to the submitted requests if the system breaks down).

Such requirements are best satisfied by commercial platforms. The project has thus collaborated with the top-five platform vendors: IBM, Microsoft, Oracle, Bea, and Sun. The problem was to implement the PEOPLE framework on those platforms, using their components and features, but without losing any characteristics or benefits in the overall product.

Four of these partners are Java based. The first technical activities concerned the translation of the reference implementation to the specific DBMS (database management system) and application-server environments. Subsequently, various devices were developed to allow the PEOPLE framework to interface with these platform components.

A different approach has been taken for the Microsoft platform because of the difficulties related to the ownership property of programming languages.

The vendor implementations kept the layered structure of the reference implementation. A test and certification process guaranteed full architectural compliance.

This result was achieved by developing a dummy service to verify the following:

- The integration with the reference-implementation PEOPLE node using the service running on the vendor's front-end node
- The integration with the vendor PEOPLE node using the service running on the reference-implementation front-end node

Another cornerstone of the PEOPLE project was the modeling approach. This was tailored to UML (Unified Modeling Language) modeling constructs used in business management.

The modeling group represented online services as business objects and designed the model. A very important distinction was made between shared objects and domain-specific objects.

The main modeling artifacts were the following:

- Business use case diagrams representing and describing online services for each category
- Activity diagrams representing the typical work flow of online services from the first step to data submission (front-end requests)
- Class diagrams referring to online services representing business objects, their associations, and hierarchies in order to distinguish between objects, documents, receipts, requests, responses, forms, and so on

UML diagrams and objects defined the data needed to support the interactions between the front-end applications (online services) and the back-end systems. Data had to implement Web-services standards fully and be generated as XML (Extensible Markup Language) schema definitions (XSDs). XML files exchanged between the front end and the back end had to be compatible with this structure.

The architecture of PEOPLE allows different ISVs with different knowledge of several application domains to be chosen without losing the coherence and the common design of the services.

After a few months, all ISVs could release online services running on a solid architecture compliant with the modeling standards already described.

A crucial part of the service implementation was the testing and certification process to guarantee that the same service would work properly on the information systems of several different municipalities, fulfilling all functional and technical requirements.

The online services certification process was divided into two main activities:

- Functional certification to guarantee the satisfaction of all functional requirements gathered by many users and domain experts belonging to different municipalities, both in the mail-sending scenario and in the Web-services scenario
- Architectural certification to certify correct interaction with the framework, the implementation of a common user experience, and compliance with XSDs generated by UML object models representing data exchanged between the front end and the back end

The functional certification activity was divided into three steps:

- Verification and certification of technical specifications sent by ISVs in order to guarantee coherence between the detailed design and the test plan
- Execution of test cases by user representatives and feedback to ISVs to fix bugs and errors
- Verification and certification of test results

The architectural certification activity involved five steps:

- Test of the services in the reference implementation in order to guarantee correct interfacing with the front-end node and with the PEOPLE node; the services that did not pass this step were returned to the suppliers
- Verification of compliance with look-and-feel standards
- Verification of compliance with accessibility guidelines
- Verification of correct interfacing of infrastructural services
- Test of the vendor implementations' front-end nodes in order to verify interoperability

Once all these activities and steps had been performed, each individual service was declared a certified PEOPLE online service, ready to work in a PEOPLE-compliant environment. In response to the municipalities' priorities, it was decided that two categories of services would be implemented: demographics and tax services. In this way, all municipalities could start the deployment process on the preferred platform, taking account of their back-end systems and integration needs. At the same time, other categories of services were developed by many ISVs for the Java and the .Net environments. To this end, a stabilized framework, a standard model for future development processes, and a tested certification process were used.

Once this first phase of deployment has been completed, all municipalities will be able to easily deploy other family services without difficulty.

## FUTURE TRENDS

As mentioned above, the deployment process has already started, and before the deadline of March 2006, all the services will be available to the PEOPLE administrations' citizens. The PEOPLE network is also expected to be enlarged to at least 300 municipalities. This enlargement will be on a voluntary basis and will depend on a contribution proportional to the administrated population.

## CONCLUSION

PEOPLE offers one of the most important opportunities for the local government in Italy to develop its structure in line with the European e-government legislature and to bridge the digital divide created by the massive introduction of ICTs.

The main benefits expected for all local authorities, irrespective of their size, are the following:

- A strong impulse to develop new integrated systems for companies and citizens
- Scaled costs equally distributed among each local administration taking part in the project
- The creation of online services and high—quality, innovative solutions
- The spread of technical and organizational know-how that is essential for the innovation of local administrations
- The management of the major e-government issues, using integrated, coordinated, and modular investments and architectures
- The optimization of procedural management timetables
- The rationalization of communication systems between different local administrations and within the local administration itself
- The creation of a shared and constantly updated professional level of excellence

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## KEY TERMS

**Front End and Back End:** Interface of the PEOPLE program respectively for the front office and the back office.

**J2EE Technologies and .Net Technologies:** The project based on the Java 2 Platform Enterprise Edition (J2EE) language and the Microsoft .Net one, respectively. This choice allows each local authority to choose the preferred language, avoiding further investments to link the new interface to the internal back-office system.

**Multichannel Network System:** The project planned a very complex access system to the PEOPLE network that will allow the connection and the supply of the provided services through different media, such as PCs (personal computers), mobile phones, digital television, and so on.

**Online Front Office:** The main goal of the project is to substitute the physical front office used by public authorities to supply services with a Web portal system, giving citizens the opportunity to access those services from a simple PC.

**PEOPLE Project:** The most important e-government project in Italy, it aims "to innovate and to simplify the relationships between Local Public Administrations and citizens" through the online delivery of almost all the services provided by local bodies.

**Virtual Service Layer:** Layer of the program that acts as a connection between the front end and back end and that contains the structure of each service provided.

# Integrated Online and Offline Advocacy Campaign Strategy

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## INTRODUCTION

Advocacy campaigns are considered by many to be the second cornerstone of a pluralistic, democratic society. While many may focus on the first cornerstone, voting, advocacy campaigns provide the opportunity for citizens to pool their voices to influence public policy in between elections, when the business of governing takes place. Historically, citizens would return their focus to their immediate lives shortly after a presidential election, with a more modest peak during off-year congressional elections. But with the convergence of the Internet and politics, mid-election participation is easier. Online grassroots advocacy tools help interest groups organize in a day, or two, campaigns that can easily generate tens of thousands of e-mails, faxes, telephone calls, and telegrams to policymakers at any level of government, or even at any private or international organization. These campaigns have had a major impact on the legislative process, including drastically reshaping the workload of congressional (Fitch & Goldschmidt, 2005) and agency (Shulman, 2005) staff responsible for processing citizen communication and making legislative and regulatory decisions more responsive to citizen concerns.

Perhaps the most colorful story of the origins of legislative advocacy in the United States focuses on meetings between legislators and favor-seekers in the lobby of the Willard Hotel, near the White House, in the early 1800s. These "lobbyists" would wine and dine lawmakers in order to gain favor on the various issues before congress (American League of Lobbyists, 2003).

While early lobbying was (and to a great degree remains) a process that relies on personal relationships and interactions between a lobbyist and lawmakers, the scope of lobbying has evolved over time to include the integration of more widespread citizen participation through interest groups and grassroots campaigns. According to David Truman in his seminal work on pluralistic politics, interest groups form as a result of a disturbance in the polity that makes people take notice of an issue (Truman, 1958).

Initially, interest groups started locally and grew into national organizations. As they grew larger and more unwieldy across great distances, they faced inevitable stress on an occasional breakdown of their internal lines of communication. The Internet gives the opportunity for immediacy of communication and drastically reduces the effort involved. Interest groups now have a wide range of online tools for developing and nurturing thriving communities of like-minded people without concern for geographic proximity or scheduling/time-zone differences.

From television to the Internet, the public has seen dramatic increases in their access to information about the issues that matter to them. By providing an explosion in the number of channels of communication, television (and radio) broadcasted huge amounts of uniform information. But the communication was only one-way. The Internet added multi-way communication and full-text searchability to a wealth of information on an unimaginable number of topics.

This increased access to issue information, combined with the advent of new, online tools to help citizens communicate with lawmakers, has ushered in a new era of mass movement-based advocacy politics. Educating and mobilizing hundreds of thousands, and potentially millions, of activists to voice their opinions to congress in a short period of time, even in just a day or two, is a reality now. With a good strategy, interest groups can provide sufficient education and guidance to their advocacy communities to make a clear and effective chorus of voices heard in congress.

Early Internet advocacy campaigns tended to focus almost exclusively on the use of Web sites, e-mail, and online advertising as the means for educating and mobilizing citizens to get involved with advocacy campaigns. As citizens and lawmakers have become more comfortable with the Internet, advocacy strategies have become more integrated, combining the new online strategies and tactics with traditional offline strategies and tactics. Where early Internet-era advocacy campaigns were "siloed" into separate online and offline tracks, the turn of the twenty-first century has seen the separate tracks weave into an integrated strategy that uses online and offline tactics to reinforce each other in a manner that dramatically increases the effectiveness of these campaigns, both with respect to mobilizing larger numbers of citizens and giving citizens more influence over public policy formation.

As a result of these new digital tools connecting citizens to policymakers, the line between e-politics and e-government is blurring. Digital technologies bring citizens, either individually or organized by interest groups, deeper into the governmental process—from legislation, to rulemaking, to enforcement, and even into the judicial process. Indeed, the focus among e-government scholars on issues related to transparency speaks directly to this blur. Lack of transparency produces greater citizen calls for more transparency and transparency makes governments more accountable to the citizens at all process levels. Thus, no discussion of e-government is complete without a discussion of e-politics and the heightened involvement of citizens in the governmental process.

## BACKGROUND

To be *integrated*, an advocacy campaign uses *multiple outgoing communication channels* to educate, recruit, and mobilize citizens to take action supporting the campaign. It also sends citizen messages to policymakers through *multiple incoming communication channels*. Where using multiple outgoing channels extends the reach of the message to more citizens, delivering messages through multiple channels into the policymaker's office makes the messages more noticeable and harder to ignore.

Outgoing citizen mobilization and incoming policymaker persuasion messages require distinct strategies to be effective. Outgoing messages to citizen activists must be an eye-catching and a compelling call to action. Incoming messages to policymakers must persuade them to support the campaign's policy position on a bill before congress.

*Campaign channels of communication* include both online and offline modes. Online channels include online advertisements, e-mail, Web sites (both the campaign's and others'), digital video, and digital animation. Offline channels include direct mail, telephone, fax, television, radio, print ads, and billboards.

In addition to employing multiple outgoing and incoming communication channels, what makes an advocacy campaign integrated is the strategy for using these multiple channels in a mutually reinforcing manner, with two goals. The first goal is to mobilize citizens to express their views to policymakers. The second is to persuade the policymaker to support the campaign's position, which, if achieved broadly through members of the decision-making body, yields the desired policy outcome.

While congress and state legislatures are the most common recipients of integrated strategies, they can be targeted to any policymaking body, including regulatory agencies and corporations. Grassroots advocacy software delivers e-mail and faxes to state legislators, governors, even to city council members. Most provide easy-to-use Webforms for sending letters to the editors of local and national news publications and broadcasts. Some allow campaign managers to enter the contact information for anyone (i.e., the president or board of directors of a corporation) into a custom target field to direct a campaign at just about anyone.

Integrated citizen outreach strategies reach more people than online-only strategies because they can reach the third of Americans who do not use the Internet and the other third that use the Internet through a dialup connection. Once they reach people, the campaign can easily identify the best way to contact each person for future communication and mobilization. Once contacted through offline means, it is important to move as many people as possible to an online activist network, but it is also important to identify those who prefer to be contacted by mail or phone and continue to communicate with them in that manner. Since campaigns need to remobilize their activists throughout a campaign, as well as for subsequent campaigns, respecting the wishes of would be activists as to their preferred modes of communication helps to keep them loyal and reliable.

Another key component of an integrated campaign is a centralized database providing a regularly updated, or real-time tracking of activist communication and activity. Using this relational database, a campaign can make strategic decisions regarding budget allocation as a campaign progresses. For example, as the number of messages to specific members of congress reach target goals, online ads and phone calls that were going to be sent to people in those congressional districts and states can be redirected to citizens in other districts and states where performance levels are lagging. This allows a campaign to maximize the efficiency of its ad buys and phone banks, ensuring that all the congressional targets receive sufficient constituent messages to hold some sway.

While the rise of the Internet's popularity has opened new opportunities for engaging the polity in a meaningful way, especially in between elections, the fact remains that a sizable number of citizens remain offline and among those online, many still prefer to do politics the "old fashioned" way. Let's look at the numbers.

According to the Pew Internet and American Life Project, about two-thirds of Americans are online (Pew Internet & American Life Project, 2004a) and 88% of those online say "the Internet plays a role in their daily routines and that the rhythm of their everyday lives would be affected if they could no longer go online (Pew Internet & American Life Project, 2004b)." That said, there are still sizable gaps in access that leave seniors, African Americans, households making under $30,000 a year, and those

with less than a high school education, lagging behind the online rates of younger, wealthier, more educated, and non-African American citizens (Pew Internet & American Life Project, 2004a).

To reach the offline population, it is essential to use offline channels of communication. Telephones, television (including cable TV), newspapers, and direct mail have the ability to reach offline audiences. In some cases, billboards on the sides of trucks and buses, on the side of the road, and on top of buildings can also help campaigns reach out to citizens and drive them to take action to support a campaign.

The substantive advantage of an integrated outreach campaign lies in the rates of citizen mobilization. Industry standards regarding activation rates for traditional direct mail campaigns suggest that a campaign activating 2-4% of those contacted is considered a good response. The expectations for a phone-only or an e-mail-only campaign are the same. This suggests that a campaign reaching out to a mailing, phone, or e-mail list of one million people not already engaged with the campaign, would be delighted if 20,000 to 40,000 of them took action supporting the campaign.

An integrated campaign where, for example, a phone bank program leaves voice messages on a million answering machines with information about the issue, a call to action, and a prompt to look for a direct mail piece already on its way, followed a day or two later with that direct mail piece, which also prompts recipients to look for an e-mail on its way, can dramatically increase the action conversion rates, sometimes as high as 14%. The net result is greater than the sum of the parts because (1) multiple contacts increase the chance that the message is received and remembered; (2) opportunities to take action using the same communication channel as the outgoing message make it easier and quicker for the action to be taken (i.e., phone outreach offers the opportunity to patch-through a call to a congressional office, direct mail includes a tear off postcard to mail to congress, and the e-mail has a link to send an e-mail, fax, or telegram to the congressional office); and (3) the messages in all three communications reinforce each other, drawing attention to the next message in the pipeline and always providing information on a toll-free hotline to learn more and get patched through to congress or the Web address of the campaign's Web site where advocacy opportunities are just a click away.

This brings us to the next concern. With all activists acting online and offline, how does one manage an integrated campaign? In order to effectively manage an integrated advocacy campaign, it is essential to develop a real-time, back-end database to track the outreach to citizens using all communication channels and the resulting actions they take to support the campaign. By tracking this information in a unified database, campaigns are able to adjust tactics mid-stream in order to decrease the cost per activist mobilized. In the case of a campaign targeting congress, budget allocations for citizen outreach can be monitored on a district-by-district basis, as can the messages citizens send to congress. The real-time database helps campaign managers identify districts that have reached targeted levels of action and districts that are lagging. Because phone and online ad campaigns, especially, can be shifted on the fly to increase delivery to lagging districts, the campaign can shift outreach efforts to focus more on those districts, thereby driving more action from them.

## FUTURE TRENDS

Perhaps the most exciting development in integrated advocacy campaigns is the rising popularity of mobile communication devices. Mobile phones and personal digital assistants (PDAs) offer new opportunities to reach out to citizens. These devices can be reached via phone banks and e-mail. They provide opportunities for citizens to send messages to policymakers via phone call, e-mail, fax, or telegram. They can even be used to coordinate large groups of people who are visiting congressional offices in person.

By 1999, five years after the launch of Netscape, the Internet had reached 50% market penetration in five major cities: Salt Lake City, Seattle/Tacoma, Austin, San Francisco, and Washington, DC (Reagan National Advertising, 1999). A year later, national market penetration hit 50% (Pew Internet & American Life Project, 2004c). In 2002, digital data delivery to mobile phones was introduced (Cellular Telecommunications & Internet Association, 2004), gradually enabling more Web content to be delivered to subscribers. By May 2004, 28% of all Americans (41% of Internet users) owned mobile phones capable of receiving text messages, Web content, and e-mail (Pew Internet & American Life Project, 2004d). As market penetration for these devices grows, they will become more and more a part of integrated advocacy campaigns.

Even short of 50% market penetration, digital data delivery to mobile phones can already have an effect on integrated campaigns. For example, by introducing this mobile technology to traditional lobby days, where advocacy organizations bring its members to Washington, DC or to a state capital to make personal visits to senators, representatives, and delegates, the organizers of the visit can better manage the impacts of these visits.

Even if a thousand, or more activists converge on a capital, organizers can hand out leased or inexpensive pay-as-you-go mobile phones to their activists as they

arrive. The phone numbers for these phones can be pre-programmed into an e-mail distribution list, allowing organizers to gather all of their activists for quickly arranged meetings with key legislators.

By pre-programming the phone book of each distributed phone with key phone numbers, including the e-mail address list (the phones can send text messages to e-mail addresses, too, and a single e-mail address can be set up to send a message to every cell phone on the list), individual activists in the halls of the congress or state legislatures can serve as eyes and ears for the campaign. It allows individual activists to report to either the organizers or the whole mailing list comments they are getting from lawmakers and their staff as they visit the offices. With this real-time flow of information, lobby day organizers can quickly and effectively craft strategic responses to arguments being used to deflect efforts by the activists to influence their representatives.

In addition to using mobile phones to coordinate activists on the ground, a simultaneous e-mail, fax, and phone campaign into congressional offices draws additional emphasis to the visits and the goals of the campaign. Thus, with the increased use of mobile technology, integrated advocacy campaigns will continue to shift towards coordinated online and offline strategies.

## CONCLUSION

The advantages of an integrated advocacy campaign draw from the heightened visibility resulting from the use of multiple communication channels. When tightly orchestrated, phones, postal mail, faxes, e-mails, online ads, offline ads, and personal visits make the messages sent to policymakers difficult to ignore. Using online and offline methods to reach out to mobilize citizens increases the chances that they will understand the issue, effectively remember the details of the message when communicating with policymakers, and be more likely to take the requested action. The end result is a campaign with an impact that exceeds the sum of its parts.

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## KEY TERMS

**Channels of Communication:** Channels of communication are modes for transmitting information. They include postal mail, e-mail, telephones, television, radio, and so forth.

**Grassroots Advocacy Software:** Grassroots advocacy software are Web-based e-mail tools that allow advocacy campaigns to contact citizens and provide them with a single user interface to send messages to a variety of policymakers and opinion leaders.

**Grassroots Advocacy:** Grassroots advocacy is when ordinary citizens are mobilized to contact their legislators in order to voice their opinions on a policy issue.

**Integrated Advocacy Campaign:** An integrated advocacy campaign is a coordinated program that uses multiple channels of communication to educate, recruit, and mobilize citizen activists to voice their support of opposition to a policy to policymakers using multiple communication channels to deliver those messages.

**Interest Groups:** Interest groups are organizations that have been formed to advocate on behalf of a particu-

lar segment of the polity based upon a common set of concerns.

**Mobile Personal Digital Assistants:** Mobile personal digital assistants are telephones and other electronic organizing devices that connect to the Internet wirelessly.

**Patch-through Phone Program:** A patch-through phone program uses either a live operator or pre-recorded message to inform people about an issue, ask them to talk to their legislator, and immediately provides a toll-free connection to the legislator's office.

# Intelligent Cities

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## INTRODUCTION

In the dawn of the 21st century, information and communication technologies have radically altered the construction of our physical environment. Instead of constructing spaces that intermediate between nature and man's physical condition, a new orientation is emerging attempting to create spaces that increase man's intellectual capacity and improve the ways in which we use the environment in order to learn, innovate, and reach new frontiers. Intelligent cities belong to this new orientation; they are part of an ongoing research project for creating environments that improve our cognitive skills, our ability to learn and innovate, to foresee and prevent.

Intelligent cities combine two fundamental dimensions of our era: information technologies and innovation systems.

*...We use the term 'intelligent city' to characterize areas (communities, neighborhoods, districts, cities, regions) which have the ability to support learning, technological development, and innovation procedures on the one hand, with digital spaces and information processing, knowledge transfer and technology tools on the other hand. ....There are three basic components of an intelligent city: (1) the island of innovation formed by a community of people, production, exchange and other activities, (2) the virtual innovation system, which includes knowledge management tools and information technologies for online provision of information and innovation services, and (3) the connection between the physical and virtual innovation systems, in other words, the use of the latter by the island's community.* (Komninos, 2002, p. 198, 201).

To date, many territories have adopted "intelligent city" strategies. Public authorities in Singapore, Taipei (Taiwan), Spokane (U.S.), Seoul and Songdo (Korea), and Cyberjaya and Putrajaya (Malaysia) have implemented plans to make their cities more "intelligent." But, the most elaborated illustration of intelligent cities is to be found in the awards of the Intelligent Community Forum (ICF), which assesses communities, cities, and regions with respect to five criteria of innovation performance and digital government. During the last five years, about 20 territories from all over the world were selected by the ICF as top intelligent cities (http://www.intelligentcommunity.org).

## BACKGROUND

The concept of "intelligent city" is ambiguous. At least four different descriptions of what is an intelligent city (IC) can be found in the literature:

- ICs have been frequently defined as *virtual representations* of cities, as virtual cities; the term has been used interchangeably as an equivalent of the "digital city" and "cyber city." Nonetheless, it is certain that communication capabilities offered by a digital platform or a virtual representation of a city do not suffice for an urban system to be characterized as "intelligent."
- A second approach is derived from various electronic and digital applications involved in the *management of city operations and functions*, which make very frequent use of terms such as "information city," "wired city," "telicity," "knowledge-based city," "virtual city," "electronic communities," "electronic spaces," "flexicity," "teletopia," "cyberville," etc., (Droege, 1997).
- Thirdly, ICs are conceived as environments with *embedded information and communication technologies* (ICTs) creating interactive spaces that bring computation into the physical world. From this point of view, intelligent cities (or intelligent spaces more generally) refer to physical environments in which information and communication technologies and sensor systems disappear as they become embedded into physical objects and into the surroundings in which we live, travel, and work. (Steventon & Wright, 2006). The "Intelligent Room" is a good miniature illustration of such environment; it is laboratory room which supports computer vision, speech recognition, and movement tracking, based on about fifty distinct intercommunication software agents that run on interconnected computers (Cohen 1997).

- Fourth, intelligent cities are conceived as territories that bring *innovation systems and ICTs* within the same locality, combining the creativity of talented individuals that make up the population of the city, institutions that enhance learning and innovation, and virtual innovation spaces facilitating innovation and knowledge management (Komninos 2002, ICF, op.cit).

This diversity in the understanding of intelligent cities is due to the multiple scientific and technology disciples and social movements that take part in their creation, namely the movements towards "cybercities," "smart communities," "intelligent communities," and "intelligent innovation environments."

## CYBERSPACE AND CYBER CITIES

The term "cyberspace" was introduced by Gibson (1984) in his science fiction novel Neuromancer to describe a dystopian future based on virtual reality, artificial intelligence, and high-tech implants. With the explosion of the Internet, the meaning of the term changed radically and actually cyberspace came to describe an emerging universe of virtual spaces existing within the worldwide computer network, the Internet, and the World Wide Web. Cyber cities are virtual entities related to the physical and social environment of cities in two ways: first, by representing this environment with the help of maps, plans, two-and-three dimensional images, and text; and second, by managing this environment through the representation, communication and governance of functions and processes that take place within cities. This second aspect of cyber cities is more compatible with the origin of the term, which comes from "cybernetics," a theory of communication and control which places emphasis on the functional relations between the different parts of a system, and in particular, the transfer of information, feedback mechanisms, and self-organization. Cyberspace and cyber cities have some unique spatial features which make them extremely valuable for managing the physical and social environment of cities: (a) physical distance is not valid and accessibility is just few "clicks" away depending on topological linkages only (Shiode, 1997); (b) cyber spaces can be easily modified; (c) digital representations are not limited by the characteristics of physical space; (d) the production of digital space is extremely low-cost compared to physical space; and (e) digital communication enhances person-to-person communication and contact in local communities. Using these features, city planners may create digital constructs, which complement activities in the daily life of cities and facilitate the solution of urban problems.

## SMART COMMUNITIES

The initiative for smart communities was the first systematic effort to promote the link between cities and information and communication technologies. The World Foundation for Smart Communities launched it in 1997 in close cooperation with the California Institute at San Diego State University, which drafted the *Smart Communities Guide.* "A Smart Community is a community that has made a conscious effort to use information technology to transform life and work within its region in significant and fundamental, rather than incremental, ways" (http://www.smartcommunities.org). Put more plainly, a smart community is a community ranging in size from a neighborhood to a multi-county region in which public administration, enterprises and residents have understood the capabilities offered by IT and attempt to use those technologies to improve their everyday life and work in a significant, efficient manner. Smart communities in the U.S. and Canada are inspired to a large extent by local principles. Local development and prosperity depend less on decisions taken by the central-national government and more on initiatives and guidelines chosen by local leaders. Increased local responsibility is on the rise again in an age when information about markets and growth/development is becoming increasingly globalized. Globalization transfers responsibilities for decision-making at lower level, and smart communities offer some tools to deal with the new challenges (Eger, 1997).

## INTELLIGENT COMMUNITIES

Intelligent communities is a parallel, but more advanced effort. It is an initiative of the Intelligent Community Forum (ICF)/World Teleport Association seeking to promote the use of information and communication technologies for economic development, in large or small communities, in developed or developing countries.

*Intelligent Community is ICF's term for what others have called the wired city, smart community, or e-city. It is the community—whether a town, city, county, or region—that views communications bandwidth as the new essential utility, as vital to economic growth and public welfare as clean water and dependable electricity.* (ICF, 2006).

ICF's major achievement is the annual "Intelligent Community" award. Each year the Forum selects seven communities from around the world, which excel in one or more criteria concerning information and communication technologies, knowledge and innovation. These critertia

are: broadband infrastructure, knowledge workforce, innovation, digital democracy, and marketing and attractiveness of the community.

## INTELLIGENT ENVIRONMENTS OF INNOVATION

Intelligent cities in North America and Canada stand on the convergence of two major trends of contemporary urban development: digital-electronic reconstruction of the city on the one hand, and the city as an environment for creativity and innovation on the other. The European effort to create intelligent cities is based on the same mix of digital technology and innovation capabilities, but it has a different departure from the U.S. approach. In Europe the starting point for intelligent cities and regions was the concern about territorial innovation systems. The central initiatives came from the Innovating Regions Network and the European Regional Development Fund supporting the convergence of innovation, digital technology, and sustainable development of regions. The connection between innovation systems and IT is evident in the actual orientation of EU regional policy towards (1) regional economies based on knowledge and technological innovation, (2) e-EuropeRegio: the information society at the service of regional development, and (3) regional identity and sustainable development (European Commission, 2000).

## FUTURE TRENDS

Intelligence has always been attributed to the individual, characterising outstanding human mental achievements. Human intelligence has a number of specific characteristics, such as perception, learning and memory, planning and feedback action, and communication. Researchers of human intelligence clearly link intelligence to innovation, insisting that intelligence is achieving something that has never been done before by the particular individual. Calvin (1998, p. 14, 18) considers,

*intelligence as the high-end scenery of neurophysiology -the outcome of many aspects of an individual's brain organisation which bears on doing something one has never done before ... intelligence is what you use when you don't know what to do. This captures the element of novelty, the coping and groping ability needed when there is no "right" answer, when business as usual isn't likely to suffice.*

In the field of artificial intelligence, the meaning of intelligence is based on a simulation with human intelligence. Computer intelligence has been mainly defined with respect to the *Turing Test*, according to which intelligence exists when a human cannot distinguish whether a reply to a question has been given by a human or a machine. However, Fogel argues that a good definition of intelligence should apply to humans and machines equally well, and he defined intelligence as the "ability of a system to adapt its behaviour to the meet its goals in a range of environments" (Fogel, 1995, p. 24).

There are also social forms of intelligence: collective intelligence, swarm intelligence, intelligence of a population or a community. These forms of intelligence differ from individual intelligence.

*Collective intelligence ... is that which overcomes "groupthink" and individual cognitive bias in order to allow a relatively large number of people to cooperate in one process—leading to reliable action ... A less anthropomorphic conception is that a large number of cooperating entities can cooperate so closely as to become indistinguishable from a single organism with a single focus of attention and threshold of action.* (Wikipedia, 2006)

Collective intelligence is also important in the field of artificial intelligence. It is considered to be an emerging science, based on a largely distributed collection of interacting computational processes or multi-agent systems where (1) there is little to no centralised communication or control, and (2) there is a world utility function provided that rates possible histories of the full system (Wolpert & Tumer, 2001). Szuba (2001) proposed a formal model for collective intelligence, which assumes an unconscious, random, parallel and distributed computational process run by a social structure.

Intelligent cities will evolve towards a strong integration of all the above three dimensions of human, collective, and artificial intelligence. They will be constructed as multi-dimensional physical, technological, and social spaces of intelligence, learning, and innovation.

Their first dimension relates to people in the city: the intelligence, inventiveness, and creativity of the individuals who live and work in the city. This perspective was described by Florida (2002) as "creative city," gathering the values and desires of the "new creative class" made by knowledge and talented people, scientists, artists, entrepreneurs, venture capitalists, and other creative people, which have an enormous impact on determining how the workplace is organized, whether companies will prosper, whether cities thrive or wither.

The second dimension relates to the collective intelligence of a city's population. In a collection of definitions of collective intelligence by Atlee, the concepts of cooperation and synergy seem to come up constantly:

collective intelligence is defined as "the capacity of human communities to co-operate intellectually in creation, innovation and invention;" "the collective learning and creative process realised through exchanges of knowledge and intellectual creativity;" "the capability for a group to organise itself in order to decide upon its own future and control the means to attain it in complex contexts;" "the sharing of knowledge, know-how and experience in order to generate a higher individual and collective benefit than if they remained alone;" "the cooperation to solve more complex problems than individuals can;" "the capacity of families, groups, organisations, communities and entire societies to act intelligently as whole, living systems." This is the institutional dimension of the city that creates wealth and prosperity through cooperation in knowledge and innovation.

The third dimension relates to artificial intelligence embedded into the physical environment of the city and available to the city's population. This is a public AI, communication infrastructure, digital spaces, and public problem-solving tools available to the city's population. It supports individual choices and assists communication, cooperation, learning, and innovation.

For us the concept of "intelligent city" and the plan to implement it integrates all the three aforementioned dimensions of the physical, institutional, and digital spaces of a city. Consequently, speaking literally and not metaphorically, the term "intelligent city" describes a territory:

- With developed knowledge-intensive activities or clusters of such activities
- With embedded routines of social cooperation allowing knowledge and know-how to be acquired and adapted
- With a developed communication infrastructure, digital spaces, and knowledge/innovation management tools
- With a proven ability to innovate, manage and resolve problems that appear for the first time, since the capacity to innovate and to manage uncertainty are the critical factors for measuring its intelligence

What emerges from these conditions is a combination of individual, collective and artificial intelligence, which arises from people, cooperation, and IT infrastructure. It is the intelligence of the community and the intelligent machines at its disposal.

## CONCLUSION

An intelligent city is a multiplayer territorial innovation system. It combines knowledge-intensive activities, institutions for cooperation and distributed problem solving, and digital communication infrastructure and tools to maximize this problem solving capability.

The basic level of an intelligent city is its population, especially knowledge workers in innovative companies and research and development (R&D) organizations. This level gathers the city's knowledge-intensive activities in manufacturing and services, organised in a series of districts and clusters. Proximity in physical space is an important factor that facilitates the networking of enterprises, production units, service providers, and knowledge workers into innovative clusters, and into the wider urban innovation system.

A second level is made by institutional mechanisms for cooperation in learning and innovation. This level gathers institutions enhancing regional intelligence, benchmarking, venture capital financing, technology transfer, and collaborative new product development. These are intangible mechanisms necessary to mix individual capabilities and skills, and actualize the complex processes of innovation within the innovative clusters of the city.

A third level is made by information technology and communication infrastructures, digital tools and spaces for learning and innovation. These technologies create a virtual innovation environment, based on multimedia tools, network infrastructures, and interactive technologies, which facilitate market and technology intelligence, technology transfer, spin-off creation, collaborative new product development, and process innovation. A collection of such tools and multimedia which enable individuals and organisations to share knowledge and collaborate within virtual spaces, is presented at http://www.urenio.org/virtual-innovation-environment.html. However, the effectiveness of this virtual innovation environment is extremely limited if it is disconnected from creative organizations, communities, and clusters.

The endeavor of creating intelligent cities is still very much in its early days. The first applications are being developed with respect to innovative clusters and technology parks as intelligent clusters and intelligent technology parks. In such islands of innovation, the physical and institutional innovation system is being enriched with digital communication and knowledge management tools, creating an integrated physico-virtual innovation system. There are many indications that such spaces are going to multiply and cover most knowledge districts of cities. The incentive is strong, as the innovation capability of a cluster increases significantly within intelligent environments, offering information, skills, and virtual networks for cooperation.

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## KEY TERMS

**Artificial Intelligence (AI):** Systems which tend to simulate knowledge processes of the mind; a paradigm in which people attempt to elicit intelligence from machines.

**Collective Intelligence:** Knowledge capacity of human communities emerging from cooperation in creation, invention, and innovation.

**E-City:** A community or a group of buildings which follow the same IT architecture, infrastructure, and protocols.

**Intelligence:** Advanced mental abilities, including the ability to remember and use what one has learned, to solve problems, adapt to new situations, and understand and manipulate the environment.

**Swarm Intelligence:** Any attempt to design algorithms or distributed problem-solving devices inspired by the collective behavior of insect colonies and other animal societies.

**Territorial Intelligence:** Part of a new family of concepts, such as business intelligence, territorial competitive intelligence, strategic economic intelligence, distributed intelligence, social or collective intelligence, emphasizing the organized and systemic collection, analysis, and dissemination of information for business and development purposes.

**Urban Complexity:** Interaction of many parts of an urban system giving rise to emerging properties that are not found in the constituting elements of the system.

# Intelligent Citizenship Assistants for Distributed Governance

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## INTRODUCTION

One of the main reasons for lower levels of participation in the political arena by the common citizen is the apprehended distance from actions such as representative election to perceived change. People feel that they have less and less power to exercise. Impotence leaves to indifference ("it doesn't matter who will I choose ... anyway they won't care/change thinks that I consider important"). More and more technology may put another bureaucratic barrier between people and their legitimate right to exercise power: citizenship.

Politics is the process of formation, distribution, and exercise of power (Bobbio, Matteucci & Pasquino, 1983). In this sense, the term *e-democracy* (Riley & Riley, 2003) has emerged as the goal to be reached by our technology. It is defined by Clift (2004) as the use of information and communication technologies and strategies by democratic actors within political and governance processes of local communities, nations and on the international stage. Such democratic actors/sectors include governments, elected officials, the media, political organizations, and citizen/voters.

The first steps towards e-democracy (i.e., the current e-government frameworks), even though the efforts taken, are mostly centralized (Bicharra Garcia, Pinto, & Ferraz, 2004; Clift, 2004; Macintosh, 2004; Macintosh & McKay-Hubbard, 2004). Furthermore, the information they provide about government decisions and acts and their consequences are presented as (mostly) unproven facts. It is often difficult for the common citizen to check whether the myriad of data and their sources are even legitimate, not to say legal or fare. Certainly, political confidence and faith (even though mediated by technology) have some limits, to say the less. If technology is to be put for a good use it has to be not only accessible to the common citizen, he/she has to feel and exercise power not only through voting on candidates or accessing some services online.

Currently, there are two aspects considered as the main targets of e-government technologies (Riley & Riley, 2003):

- **E-Voting:** Taking part in elections or other ballots
- **E-Participation:** Allowing degrees of access to policy decision making

Thus, for the citizen the actual range of possible actions is rather narrow. Our democratic societies require bridging a gap between current IT based Democracy and well established democratic practices. A suitable option is to be served by democracy enabler social software, allowing a new dimension:

- **E-Enaction-and-Alterity:** Collective planning, monitoring, awareness, and enforcement of already set actions and decisions made by representatives and public institutions

Such an approach tries to incorporate and extend the idea presented by Clift (2003) as "e-democracy + public net-work" and illustrated in Figure 1.

Seeking for direct citizen/stakeholder/leadership involvement, this new dimension, along with the *e-voting* and *e-participation*, can be implemented with decentralized *digital citizenship systems* (DCS), composed by *intelligent citizenship assistants* (CAs). Such systems can create an extended channel to restore the capillarity of power back to the citizens. We will now discuss some

*Figure 1. Networked input and output contrasted to traditional processes. Both, e-democracy and public network are assigned similar IT tools (Clift, 2003)*

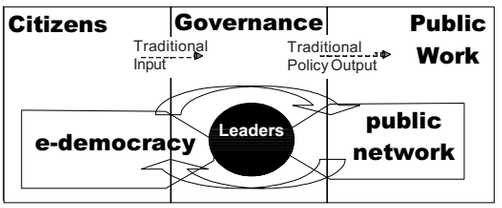
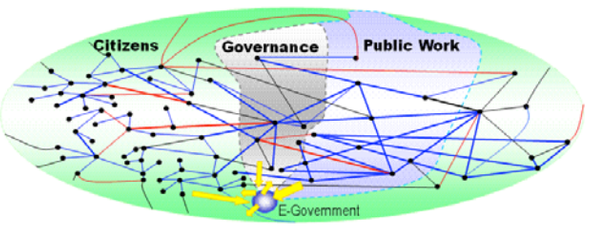



*Figure 2. Networked conception of democracy showing social networks of individuals (connected through CA's forming a DCS) co-existing with traditional (centralized) e-government facilities*




aspects that are to be explored in the quest that may (hopefully) lead to implement DCS in the near future.

## DIGITAL CITIZENSHIP SYSTEMS

Citizenship assistants are conceived as the main components of digital citizenship systems. CAs are *intelligent agents*, that is, programs that run continously, know what to do and when to intervene. Agents communicate with other agents, asking solicitations and executing the requested tasks. An agent has a long list of properties, among which can be highlighted (Jennings & Wooldridge, 1998): autonomy, social hability, reactivity, and proactivity.

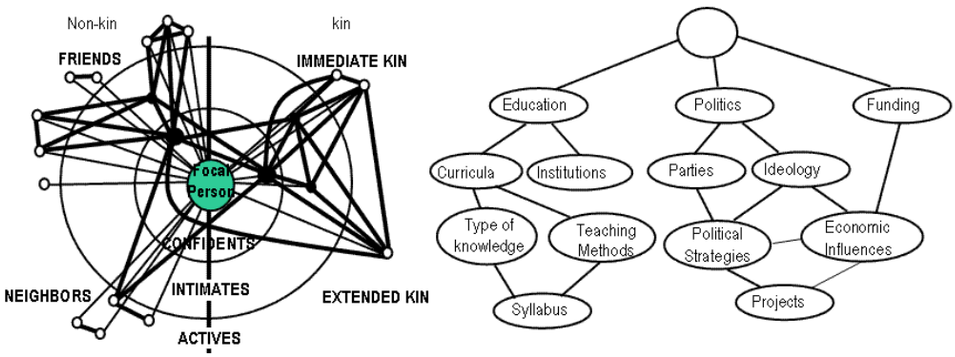
Due to the enormous amount of information accessible through the Internet, and the short time a user generally has to find relevant information, a suitable type of agent for that task is the so called intelligent information agent (Klusch, 2001). Information agents themselves are defined as computational software entities that can access one or multiple information sources that are distributed and heterogeneous and can acquire, mediate and maintain proactively relevant information on behalf of the user or other agents, preferably in a just-in-time fashion (Klusch, 2001). Citizenship assistants agents are a special case of information agents that work in a cooperative, *peer-to-peer* (P2P) manner. As in current peer-to-peer systems like Gnutella and Kazaa, some of them dedicated to share media files, citizenship assistants are conceived to work in a distributed and purely decentralized way (i.e., there is no need of a central authority or control) (Benkler, 2003; Saroiu, Gummadi & Gribble, 2002;).

To better understand such a concept, imagine the following scenario: you, as a citizen, have a dedicated intelligent citizenship assistants (CAs) in the form of a computer program. When elections come, it gathers information about the candidates (bios, affiliation, campaign related funding, etc.) looking not only on Web sites (officials or not) but also on recorded Parliament discussions and sessions, and, what may be most important, asking other people's CAs whether they have more information about obscure points. Still, your CA can analyze, classify, and filter the information according to the social and political positions of the owner of each CA (party, position, known interests, and relations). Furthermore, the CA can repute the information, checking it with the contacts of your social network. The CAs base their analysis on the reputation system formed by the owner's social networks. There is no centralized control in the complex system formed by the CAs, as shown in Figure 2.

As human societies are connected through complex *social networks* (Granovetter, 1973), there are several kinds of ties relating individuals to each other: emotional, authority, reputation, communication, etc. (Wasserman & Faust, 1994). Each contact of an individual is qualified by such ties that are implicitly interweaved referencing past experiences. A CA dedicated to serve an individual, can take advantage of those ties given that a suitable model is provided to explicitly express and qualify them (to some degree). Each individual, immersed in a social network has a subjective view of it, as shown in Figure 3 (left). The same can be said of our knowledge (i.e., given a computationally explicit model of it). A knowledge model can be expressed computationally using an ontology (Fraser et al., 2003; Guarino, 1997) (i.e., a set of interrelated concepts) (as in Figure 3, right).

The importance of CAs is even more evident when considering the effects of political decisions in day-to-day life. Citizens can have a channel to operate directly, starting their engagement focusing on the "visible" effects of politics (children's education, fares, taxes, medical care, public finances). Even more, CAs are not displacing e-government initiatives, their are complementing them, giving a chance for cross-checking data and their sources, taking back the main reasons for politics: social justice, freedom, knowledge sharing and equal opportunities (Heller & Fehér, 1989). CAs of neighbors can en-

*Figure 3. Subjective view of a social network of an individual—left (Müller, Wellman & Marin, 1999); and a very simple ontology—right*




gage (e.g., on monitoring activities of their representatives) communitary planning with public stakeholders, destination, implementation of public budget, and so forth.

Once built, DCS can represent the core common infrastructure for e-democracy and public networks. Working concurrently with e-government infrastructures, DCS can offer a robust alternative for powerful social and political interactions.

## ENABLING TECHNOLOGIES

The technological foundations for digital citizenship systems formed only by CAs are at hand, even though they have to be refined for the political domain. Table 1 summarizes some technologies needed to implement and deploy DCS.

When accessing an Internet site (provided by a server), people do so through a client program (browser). Clearly, control is on the side of the server. Instead, networks of commons are implemented computationally using *peer-to-peer (P2P)* systems. P2P systems are open, distributed, and decentralized, as human communities (Benkler, 2003; Saroiu, Gummadi & Gribble, 2002). Early examples of P2P systems where Napster and Gnutella, dedicated to multimedia file sharing.

Properties like autonomy, social hability, reactivity, and proactivity are implemented in agents through embedded Artificial Intelligence techniques. *Multi-agent systems (MAS)* are computational systems formed by agents (through federations, coalitions, etc.). MAS exhibit social behavior and, depending on the agents, can be auto-organized.

*Digital citizenship systems* can be implemented by *multi-agent systems* connected in a *peer-to-peer* mode. The components of such a P2P MAS (or DCS) would be *intelligent software agents* (or CAs). For the agents to be capable CAs, they should manipulate three basic aspects of human interaction:

- **Social Organization:** Be able to recognize groups and roles that qualify social ties
- **Social Skills:** Be aware of the social contacts that belong to the social network of an individual, be able to repute them and negotiate to proactively engage in activities towards common goals;
- **Knowledge:** Be able to interact with an individual according to a concept map that reflects the individual's profile.

Social organization and skills can be handled given that the CA can manipulate a suitable organizational model. To trace the relations between their contacts and their knowledge representation, agents must be able to represent and reason about groups they presently belong to, and also about groups they made part of in the past. To do so, a MAS organization model is needed. The MOISE+ (Model of Organization for multI-agent SystEms) is an attempt to join roles with plans in a coherent

*Table 1. A summary of infrastructural technologies for DCS*

| |
|---|
| • Semantic Web standards and techniques |
| • Auto organized multi-agent systems with organizationally situated ontologies |
| • Peer to peer knowledge and service exchange |
| • Electronic organizations and institutions |
| • E-government services |

organizational specification for MAS (Hübner, Sichman, & Boissier, 2002). While the roles build the structure of an organization, the plans build their functioning. The MOISE+ structure is built up in three levels, as can be seen in Figure 4:

1. The behaviors that an agent playing a role is responsible for (individual)
2. The structure and interconnection of the roles with each other (social)
3. The aggregation of roles in large structures (collective)

In the individual level, roles are defined and structured by an inheritance relation. A *role* is a set of constraints that an agent ought to follow when it accepts to enter a group playing that role. Roles are bound in the social level by links (acquaintance, communication, and authority). The links constrain an agent in relation to another agent. For example, an agent is allowed to communicate with another agents only if there is a communication link among them. Roles can only be played in the collective level (i.e., in a group already created from a group specification). In MOISE+, a group specification is defined by: a set of roles; a set of links; a set of role compatibilities; and the number of agents that have to play roles in this group type. For example, in Figure 4 the group *class* must have one agent playing the *professor* role, one agent as *assistant* and, at most, 40 agents as *students*. As in one organization, there can be more than one group, a structural specification is, roughly speaking, a collection of groups and roles.

When an agent has embedded an organization model like MOISE+, it can map the personal network of its human owner and handle the contacts according to social roles and groups, as can be seen in Figure 5.

The third component (i.e., knowledge) can be handled using already existent standards for the Semantic Web: OWL (the Ontology Web Language) is used to convey ontological metadata in the Internet (Kalyanpur, Pastor, Battle, & Padget, 2004). That metadata can be used to make explicit the structure and semantics of the content of Web pages (e.g., in an e-government site) helping the agent that is gathering information to filter specific contents. The metadata can also be exchanged between agents to share information about specific events and content. Programmatic tools for handling and exchanging ontological metadata are already at hand, as Open Source Software (Knublauch, Fergerson, Noy, & Musen, 2004). An example of the interface of a real intelligent agent working in a P2P system for communitary knowledge exchange using ontological metadata is shown in Figure 6.

The consequence of having an agent (CA) with the required skills is that it can integrate three different views of the individual: (i) his or her social contacts; (ii) his or her subjective organizational view of them (assigning groups and roles to them); and (iii) the knowledge (set of related concepts) related to groups, roles and contacts. This can be seen in Figure 7, which depicts the same agent of Figure 6, now filtering the contacts that are more closely associated (i.e. those that were more helpful) with regards to a given concept ("knowledge representation" and "agents"), not forgetting the roles that were assigned subjectively to each contact by the human owner of the agent. For example, the agents not only know "what," but also "who knows who; and who knew what (and when)."

A correlated issue, security, and privacy, long ago raised by Chaum (1985), can also be improved: a CA that knows its owner's profile has the possibility of manifesting a distinctive footprint (something like a "personality trace" that may be reputed by its peers).

*Figure 4. Structural specification using the MOISE+ organizational model*

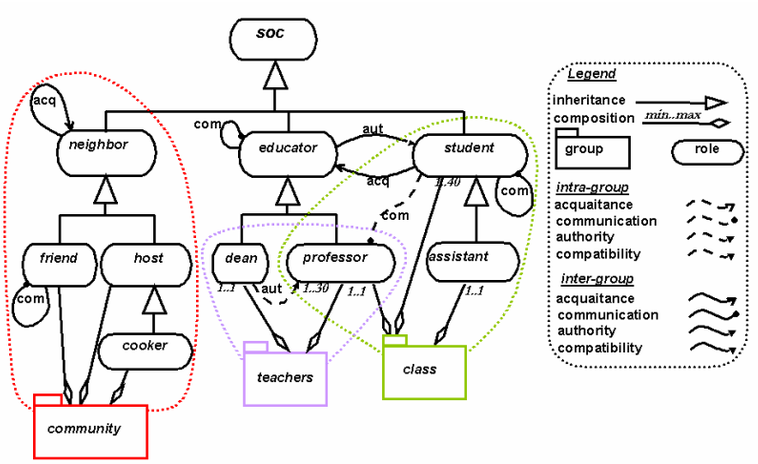
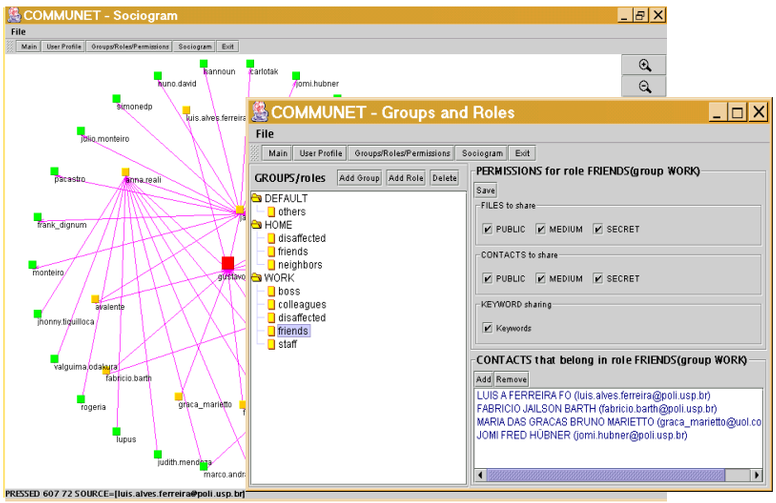


*Figure 5. An agent capable of recognizing contacts in a personal network according to roles and groups (Giménez-Lugo, Sichman, & Hübner, 2004)*




However, additional research work is needed on electronic institutions (i.e., modelling, publication, adoption, and evolution of computationally explicit representations and management of institutions). Such institutions, as well as their internal processes, can be suitably described using ontological metadata, allowing agents to focus on specific roles (e.g., comprising politicians and representatives) and their related actions. Much of the work done has focused on business applications (Esteva, Rodriguez, Sierra, Garcia, & Arcos, 2001). Actually, most of the existing models for electronic institutions simply follow old managerial concepts (matching organizations with enterprises and, at most, with ecologies). There is a need for a sociological and anthropological approach to organizations, incorporating a lato sensu perspective (e.g., communitary and family relationship structures).

To take full advantage of the capabilities of a DCS there is a need for e-government infrastructures that could handle electronic organizations, with capabilities to represent computationally, publicize, and continuously

*Figure 6. An agent capable of using ontological metadata for knowledge sharing in a social network (Giménez-Lugo et al., 2004)*

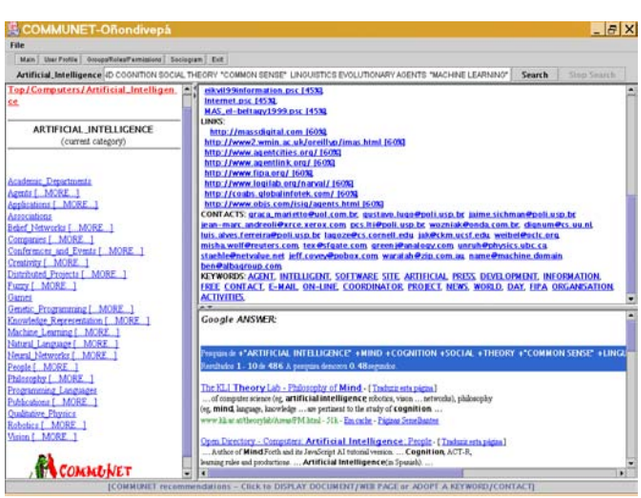


*Figure 7. An intelligent agent can connect the subjective organizational view of an individual with the related knowledge*

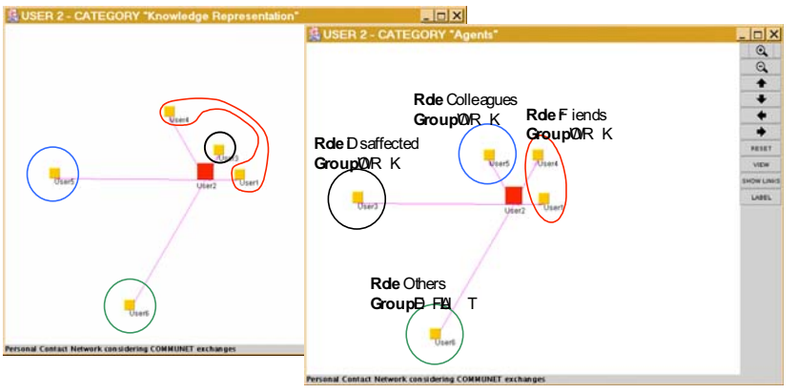
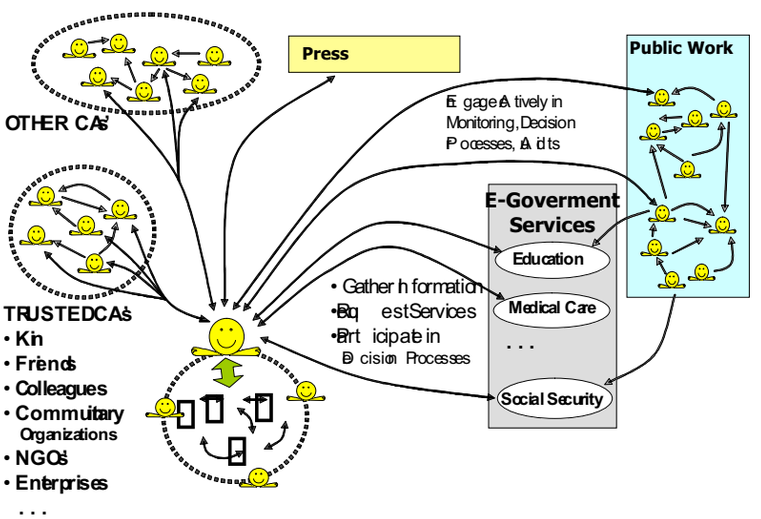



*Figure 8. Diverse communication channels and actions on which a* Citizenship Assistant *can get proactively involved.*




update evolving public institutions. CAs themselves, as auto-organized elements, are considered to be endowed with the appropriate tools to manipulate organizations and their representations. For example, an e-service may use an ontology (Fraser et al., 2003) along with the structural organization of, say the city council's educational committee, to help a CA when it is trying to find the appropriate person to which a group of parents may address a request. On the same way, CAs may be flexible enough to update themselves using new components certified by trusted CAs (as-needed) and sites.

Each CA may have several forms of interaction with the different organizations (private and public) and sources of knowledge and services. Figure 8 shows the envisioned scenario.

Given that e-government services, the press and also private enterprises make available ontological metadata (a process that has already began thanks to continuous business intelligence/business to business efforts), CAs will have a wealth of semantically situated content to harvest. Meanwhile, the main work is focused on improving the capacity to convey semantically sound content between peers (i.e., commons), as this will smoothly lead to refine the very same tools for manipulating ontological metadata from Institutions.

*Table 2. A list of reasons for utilizing physically distributed infrastructures based on intelligent citizenship assistants*

- Citizenship ubiquity
- Citizen-oriented administration of services
- Community–oriented budget management
- Community-driven policy and legislation
- Distributed decision making and control
- Fast and continuous adaptability of governance actions to people decision
- Possibility of online and in-depth audit of public accounts and decisions
- Possibility of *track-check-and-analyze* based audit of representative's actions and decisions
- Higher possibility of detecting locally important communitary issues
- Possibility of building and accessing repositories of communitary knowledge and actions comprising already known problems/solutions
- Opening of direct communication channels for individuals and public organizations alike

Table 2 tries to summarize the arguments that justify the quest for implementing and deploying CA-based digital citizenship systems.

Technology must be people oriented. In this sense, a lot of technical expertise has been bound by market parameters. If there is to be implemented a democratic information infrastucture for political participation, it should encompass decentralized social interaction, far more pervasive than clicking on a Web page of a Web site. Table 2 sketches just some of the services that can be made available through CAs forming a digital citizenship system.

## CONCLUSION

Paraphrasing Benkler (2003), "the reorganization of production (may we say *politics*), and the advances it can bring in democracy, autonomy, and social justice will emerge, if it emerges, only as a result of social and political action". That is the real challenge digital citizenship systems will face.

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## KEY TERMS

**Citizenship Assistant (CA):** An intelligent software agent designed for knowledge gathering, filtering and sharing, using ontological metadata. A CA is dedicated to a human user, having the capability to map and handle the personal contacts of its owner as possible sources of knowledge as well as spidering institutional sites for public information.

**Communityware:** A kind of social software dedicated to serve human communities, supporting social networks. Awareness is an important concept for such systems, i.e., given a request from an individual (or a group of them), the system must facilitate a way of retrieving the related (and/or useful) individuals and resources.

**Digital Citizenship System (DCS):** A kind of multi-agent system, formed by citizenship assistants.

**Electronic Institutions:** Institutionalized electronics organizations composed of software agents and individuals playing roles and following specific rules for interaction and functioning.

**Enaction-and-Alterity:** In the sense that experience is an activity of encountering with the world (in which we are embedded). That is being-in-the-world, and when applied to citizenship in particular *being-in-a-democratic-society*. Implying that this *being-in-a-democratic-society* is *thinking-considering-the-others*. The concept was coined referencing two philosophic notions: one based on the work of H. Maturana and F. Varela (*enaction* in the sense of embodied cognition) (Varela, Thompson, & Rosch, 1991) and the other by E. Lévinas (*alterity*, or the relation with the *other-that-is-not-me*)(Lévinas, 1991).

**Groupware:** A kind of software (a subset of communityware, in a sense) that supports collaborative work of teams. However, it is based on explicitly declared processes.

**Intelligent Software Agent:** A computer program that makes use of artificial intelligence techniques to show intelligent (and social) behavior, usually intended to ease common tasks like e-mail filtering and Web searching.

**Multi-Agent Systems:** A kind of systems composed of distributed elements (programs called software agents) that can be modeled and implemented according to a social vision of behavior.

**Ontology:** A set of concept definitions expressed in a way that is suitable to be understood by a computer program.

**Social Software:** A (desirably distributed) computer system, dedicated to serve human societies, that has its functioning built bottom-up (i.e., depending on the actions and decisions of each individual). Such a (possibly very) complex system is composed of a (very) large number of relatively small computer programs (or a set of them) dedicated to individuals that interact with each other in a non-deterministic way.

# Intergovernmental Digital Government through G2G Relationships and Applications

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## INTRODUCTION

Increasing governmental complexity is a global phenomenon marked by the need for multiple organizations to interconnect their policies, business processes, information, and systems in the service of shared public goals. These goals encompass some of the most important responsibilities of government including environmental stewardship, education, healthcare, and public safety. For these kinds of responsibilities, working across both vertical and horizontal boundaries is an essential feature and fundamental challenge.

## BACKGROUND

Digital government advocates often point out that citizens should not need to know how government is organized in order to access its information and services. Most digital government initiatives launched in the last decade have therefore taken a citizen-centric focus which encourages alignment of various systems, organizations, and processes toward a single external target—high quality citizen services. These efforts have been dubbed "G2C" or government-to-citizen applications. Similarly, governments have used a "G2B" or government-to-business approach to achieve alignment, rationality, and better performance in the functions which bring businesses into contact with government. Much less attention has been paid to a third approach, "G2G" or government-to-government connections, yet the interdependencies and functions which cross the boundaries of agencies and jurisdictions are crucial to most major public programs. G2G programs may be internal to government such as in financial management, but they also comprise the underlying fabric of most programs that serve citizens and businesses. While the citizen may not need or want to know how government is organized, the structure of government, including its intergovernmental dimension, remains a fundamental factor in the design of programs, systems, and services (Cameron, 2001). This structure is embedded in and supported by legal and constitutional frameworks. However, the emergence of e-government challenges even those frameworks by its need for an architecture that links different parts of government in new ways that restructure not only administration but also budgets, legal authority, and constitutional relationships among units of government and between government and the private sector (Morrison, 2003). The limits of legal authority often rest on the basic assumption that agencies work alone and inside fixed geographic boundaries. Consequently, networked services raise new legislative and regulatory issues of authority, security, privacy, and accountability when information and responsibilities cross-organizational or jurisdictional boundaries (OECD, 2003). In addition, intergovernmental initiatives involve different institutions and agencies with their own organizational cultures and business practices which need to be understood and meshed together into an intelligent whole.

The terms "intergovernmental" and "G2G" are used in several ways. They can denote horizontal arrangements of inter-agency or inter-jurisdictional relations at the same level of government. For example, regional-level transportation, motor vehicle, and police agencies may cooperate to analyze auto accidents, or several municipalities within a region may share a purchasing and procurement system. G2G is also used to describe international systems such as those which support free movement of European citizens across the borders of EU member countries (European Commission, 2003). Vertical G2G systems link multiple *levels* of government in a coherent service delivery or administrative environment. In political science terms, they are systems that mirror federal or federated systems of government, which typically comprise national, regional, and local units and their respective agencies. Regions are typified by states in the U.S. or provinces in Canada. Local governments include cities, towns, and other municipalities. In practice, large intergovernmental systems may have both vertical and

horizontal elements. The principles and strategies presented in this article are relevant in all of these contexts.

## INTERGOVERNMENTAL RELATIONS AND SYSTEMS

Intergovernmental relations among levels of government are characterized by both interdependence and complexity. Interdependence means power is shared requiring mutual accommodation. Complexity derives from the large and differentiated intergovernmental network that prevents any one participant from having "enough information about its components and dynamics to make rational decisions on its own or to operate in isolation from the rest." (O'Toole, 2000, p. 19).

Many models have been developed to conceptualize intergovernmental relations. One useful set contrasts different forms of authority relationships among levels of government (Wright, 1988). In the coordinate-authority model, a national government has defined powers, local authorities are creatures of regional governments, and the regions and localities together exercise powers separate from those given to the national government. The inclusive-authority model conveys a hierarchical, dependent relationship among the levels with the most power at the national level and increasingly less at regional and local levels. In the overlapping-authority model, the three levels of government are seen as interdependent, each having substantial areas of overlapping authority, some areas of autonomous authority, and limited power and influence that necessitate many forms of negotiation and bargaining. This third model, with its many mechanisms for negotiating and managing the interconnections (Agranoff & McGuire, 2004), is most widely accepted as a conceptual representation of modern intergovernmental relations (Opeskin, 2001). It conveys the idea that intergovernmental structures are managed networks of interdependent organizations (O'Toole & Meier, 2004). Three examples of G2G digital government illustrate this model. *Service New Brunswick* offers residents of one Canadian province access to online services of the Canadian national government, the province, and their local municipalities through a single Web portal. Although transparent to citizens, all three levels of government are at work behind the scenes linked by policies, technical infrastructure, and standards. In Italy, Austria, and other European countries, the adoption of electronic citizen identification cards requires an intergovernmental infrastructure of policies, data standards, security protocols, telecommunications networks, and organizational processes that cross national, regional, and municipal boundaries. In the United States, The National Map project provides a variety of geospatial data and information to government, private sector, and individual users. It is the product of a consortium of federal, state, and local partners who voluntarily provide layers of geospatial data for use at global, national, and local scales.

### G2G Issues and Challenges

Research on intergovernmental information systems shows that they operate in an extremely complex environment. This complexity derives from a profusion of authorities, roles, and relationships; great variety in local conditions; diverse agency cultures and missions; ever-changing technologies; and limited ability to adapt to change (Dawes & Pardo, 2002). The basic structural and philosophical differences among levels of government present major challenges. For example, the greatest financial and professional resources for intergovernmental work often lie at the national level, but the best knowledge of clients and service delivery considerations is regional or local. Local officials tend to be generalists and to work closely with the communities they serve; by contrast, regional and national officials tend to be specialists, to focus on broader policy concerns, and to be removed from the day-to-day demands of program operations. In addition, local officials are focused on the specific needs of their own communities, while regional and national officials are more concerned with broad consistency and equity across larger geographic, demographic, and cultural divisions. In jurisdictions with many local units, the wide variation in local conditions—economic, demographic, geographic, cultural, and historical all add to the complexity (Dawes, Pardo, Connelly, Green, & McInerney, 1997).

When digital government systems are built to support intergovernmental functions, they often oversimplify diversity and complexity, leading to inappropriate or uncoordinated policies and actions and causing poor performance and unclear accountability. Oversimplification is especially problematic in two respects: when it masks the often low level of technical expertise and infrastructure at the local level and when it ignores the business practices already in place. Moreover, the tendency of governments to create a proliferation of programs (each with its own legal authority, funding stream, reporting requirements, and administrative structure) has led to a similar proliferation of independent information systems that each support only one business function or satisfy one particular program need. As a result, a large and growing number of individual systems for G2G business relationships are employed across levels of government. This multiplicity of systems require their own hardware, software, security, and business rules. In order to perform business functions on each system, users require numerous log-ins and

authentications. Usually data entered into one system cannot be used in another. Duplicate requests for information are made and fulfilled as individual organizations respond to uncoordinated requirements. Systems are seldom interoperable across levels or agencies or designed with the full range of information needs or business practices in mind. This situation poses a significant burden and entails higher than necessary costs for everyone. (Cook et al., 2004).

To be successful in this environment, G2G systems must recognize and account for enormous diversity of community settings, technical expertise and infrastructure, organizational structures and cultures, and staff skills. They must also deal with overlapping legal authorities; different fiscal years; and independently elected officials at each level. Finally, they need to be meshed into the fabric of ongoing business processes and working relationships and often must relate to other information systems at the national, regional, and local levels.

## Principles for Guiding G2G Digital Government Initiatives

Several critical success factors pertain to any effective information system. They include top management support, a clear and measurable purpose, focus on business needs as the driver and technology as a vehicle for achieving them, consistent and frequent communication, and incremental and modular approaches to system design and implementation.

While the factors listed above are important for all digital government initiatives, G2G projects have additional needs. Because the interconnections reflect overlapping authorities, these systems require coordination, negotiation, and consensus-building across multiple legal structures as well as policy, management, and technical perspectives. Accordingly, three principles are strongly associated with more effective G2G initiatives:

- **Peer Relationships:** The differences in operations, mission, size, specialization, and infrastructure across government units are of significant consequence. In order to work toward the same or complementary goals, all participants need to understand and appreciate one another's abilities, strengths, and limitations. This kind of understanding is most likely to occur when the participants regard one another as peers in an interconnected network, rather than as superior and inferior players in a hierarchy. Peer-level relationships include open dialog, mutual adjustment, and shared resources, benefits, and risks. These in turn imply basic trust and extensive information sharing and interaction (Cook et al, 2004).
- **An Enterprise Approach:** Enterprise thinking emphasizes the interdependencies among different domains, organizations, and levels of government. In terms of public services, "enterprise" may also include the private businesses and nonprofit or civil society organizations that play important roles in the administrative or service delivery processes. (Goldsmith & Eggers, 2004). Enterprise approaches seek to capitalize on the relative strengths of different players and to tie them together through the use of models, standards, partnerships, and shared resources. This "joined up" strategy can transform policy making, program evaluation, public management, and service delivery (UK Cabinet Office, 2004). Enterprise management emphasizes complete business processes and coordinated design, development, implementation, and operation of functions regardless of where any particular activity or task takes place. (Cook et al., 2004).
- **Information Treated as a Cross-Boundary Asset:** Much of the benefit that can be derived from G2G initiatives rests on the creation and use of shared data repositories that all the participating organizations accept, use, and support. Standards and policies allow the participating organizations to replace multiple, uncoordinated databases with comprehensive and authentic data resources that are defined and managed for the benefit of all users. When they meet stringent tests for quality, security, and usability, these shared data resources can drive down costs, increase accountability, and support integrated services and programs (Dawes, 1996).

## Strategies for G2G Digital Government

While principles provide high-level guidance and direction in G2G digital government, practical strategies support the everyday actions that help move initiatives closer to success. The following strategies have demonstrated value.

- **Establish a Joint Governance Body:** Governance comprises the structures and processes by which policies are adopted, disputes are resolved, and decisions made. For information systems and strategies to work well in a G2G environment, governance must include formal representation and active participation of officials from every level. One critical aspect of successful shared governance is an acknowledgment that all the participants have a legitimate role to play. This is not to say that all are equal in every respect. Their resources and respon-

sibilities will vary, but the decision-making process must give full consideration to needs and capabilities of each level of government and kind of organization. A shared governance mechanism provides a forum to voice needs and concerns throughout the life cycle of an initiative. (Allen, et al., 2004). An example is the e-Core Advisory Committee for EMaryland Marketplace, the State of Maryland's e-procurement portal This cross-agency and intergovernmental governance committee meets regularly to provide cross-boundary communication and guidance, devise alternatives for resolving policy questions, and keep a focus on long-term goals. Members represent primary procurement agencies, other major state agencies, and local governments. (Krysiak, Tucker, Spitzer, & Holland, 2004)

- **Perform End-to-End Process Analysis:** Intergovernmental information systems are electronic applications that support processes shared across multiple levels or agencies of government. Development of effective systems depends in large part on understanding complete processes and their multifaceted environments. Those who perform the tasks should participate directly in process mapping, analysis, and improvement. This is particularly important when processes cross the boundaries of organizations, programs, and levels of government, as participants will better understand their specific roles in the context of the entire process. This kind of process analysis is also essential when a new process will operate along side or in tandem with existing ones. As part of this effort, field visits are invaluable in gaining an understanding of local conditions as well as learning about operations and customers from those on the front-line. (Cook et al., 2004). In Catalonia, for example, the Open Administration Project including its inter-administrative portal (CAT365), is tackling the difficult challenges of both vertical and horizontal process re-engineering in order to design new electronic service channels and to harmonize them with traditional service delivery arrangements. (Aibar & Urgel, 2004).
- **Assess the Complete Cost Structure:** Traditionally cost estimates for information technology initiatives include well known categories such as hardware, software, design, development and implementation. But with G2G initiatives other equally important components, especially project management and relationship management, are often left out because they are difficult to estimate or simply overlooked. Moreover, cost structures should be comprehensive and reflect the financial implications for each level of government. For example, the New York State-Local Gateway project, the majority of the state-level costs were estimated to be attributed to design and development whereas the local-level costs centered on implementation and changes in existing business processes (Cook et al., 2004).
- **Apply Specialized Project Management Techniques:** G2G projects do not have a unified authority structure culminating with a single leader. They therefore require managers with specialized skills and a set of analytical, collaboration, and problem-solving tools well-suited to hold the intergovernmental network together. The OECD emphasizes the importance of both traditional management skills and additional competencies in performance management, accountability frameworks, and collaboration (OECD, 2003). More than anything else, intergovernmental managers must understand and manage complexity. They must coordinate interdependent streams of work, and communicate and broker relationships among all the key stakeholders throughout the life of the project. They need to employ an array of communication practices to ensure that all stakeholders (including elected officials, senior executives, and the public, as well as the project participants) are continually and adequately informed (Dawes & Pardo, 2002).
- **Demonstrate and Refine Ideas by Prototyping:** Prototyping presents the opportunity to gather realistic information about a process or system and provides a forum for identifying improvements in architecture and design. Prototypes test certain aspects or characteristics of a desired system without incurring the cost or time of actually building a full system. They include just enough functionality, data, and presentation features to build mutual understanding between designers and users and to test key elements of the design. The most valuable aspect of a prototype is that it makes implicit understandings explicit so they can be tested by others. In Europe the INSPIRE project (Infrastructure for Spatial Information in Europe) incorporates prototypes and pilots to develop representative use-case scenarios, demonstrate feasibility, and determine costs and benefits of interoperability for supporting Pan-European environmental policies and impact assessments (Dufourmont, Annoni, & DeGroof, 2004). Prototyping can be invaluable in G2G systems because it forces the multiple assumptions of different participants to be examined in a practical, tangible, and inexpensive way. Because they demonstrate essential functionality, prototypes can solidify mutual understanding and reveal differences in expectation long before formal system development makes change difficult or impossible to attempt. (Cook et al., 2004).

- **Measure Separate and Collective Aspects of Performances:** G2G digital government initiatives have a dual character. They support a coherent business process or service, but to do so they rely on performance in different organizations at several levels of government. The involvement of multiple actors makes it especially important to devise performance measures and measurement approaches that address all three traditional categories of performance: inputs, outputs, and outcomes, all suited to the kind of service or function being supported (Stowers, 2004). It is equally important to differentiate where in the relevant business processes the different measures are being applied in order to understand which activities in which organizations contribute to different results. For this reason, performance measures must focus both on the ultimate results and on the major components of work that produce it. Separate and collective determinations of what data is needed to measure effectiveness will be needed. Ideally, the system itself would be designed so that relevant performance data is captured and analyzed in the course of normal operations.

## CONCLUSION

G2G applications are critical in providing effective digital government. They support the many internal operations of the public sector and provide the underlying foundation for a large proportion of public services. This important work has evolved rapidly with the introduction of advanced information technology which provides more flexible tools for coordination and information sharing. However, successful G2G initiatives also address the legal, political, organizational, and operational dimensions of working across the levels of government. They employ principles and strategies that are suited to the complex and interdependent nature of intergovernmental relations. These principles and strategies deal simultaneously with both the whole enterprise and its component parts. Despite substantial challenges, intergovernmental collaboration has to the potential to link the layers of government in the pursuit of important public goals—negotiating issues, capitalizing on relative strengths, and accommodating diverse needs and conditions.

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## KEY TERMS

**Enterprise:** An approach that emphasizes the interdependencies among different domains, organizations, and levels of government and focuses on understanding and addressing broad purposes.

**Federalism:** A system of governance in which a national, overarching government shares power with subnational or state governments. A federal system has (1) a written constitution that divides government powers between central government and the constituent governments, giving substantial power powers and sovereignty to each, (2) levels of government, through their own instrumentalities, exercising power directly over citizens, (3) a constitutional distribution of powers that cannot be changed unilaterally by any level of government or by ordinary process of legislation (Shafritz, 2004, p. 116).

**Government to Business (G2B):** A digital government initiative that delivers a service from government directly to businesses. A G2B initiative usually try to achieve alignment, rationality, and better performance in functions that bring businesses in contact with government.

**Government to Citizen (G2C):** A digital government initiative that delivers a service from government directly to citizens. A G2C initiative usually encourages alignment with systems, organizations, and processes toward high quality citizen services.

**Government to Government (G2G):** A digital government initiative that is internal to government but may cross agency and jurisdictional boundaries. A G2G initiative usually links multiple levels of government in a coherent service delivery or administrative environment.

**Intergovernmental Information System:** A technology application that links multiple levels of government agencies together in a coherent service delivery or administrative environment.

**Intergovernmental Relations:** The complex network of interrelationships among governments political, fiscal, programmatic, and administrative processes by which higher units of governments share revenues and other resources with lower units of government, generally accompanied by special conditions that the lower units must satisfy as prerequisites to receiving the assistance (Shafritz, 2004, p. 159).

# Inter-Governmental Relations in the Provision of Local E-Services

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## INTRODUCTION

Australia is a nation of 20 million citizens occupying approximately the same land mass as the continental U.S. More than 80% of the population lives in the state capitals where the majority of state and federal government offices and employees are based. The heavily populated areas on the Eastern seaboard, including all of the six state capitals have advanced ICT capability and infrastructure and Australians readily adopt new technologies. However, there is recognition of a digital divide which corresponds with the "great dividing" mountain range separating the sparsely populated arid interior from the populated coastal regions (Trebeck, 2000). A common theme in political commentary is that Australians are "over-governed" with three levels of government, federal, state, and local. Many of the citizens living in isolated regions would say "over-governed" and "underserviced." Most of the state and local governments, "… have experienced difficulties in managing the relative dis-economies of scale associated with their small and often scattered populations." Rural and isolated regions are the first to suffer cutbacks in government services in periods of economic stringency. (O'Faircheallaigh, Wanna, & Weller, 1999, p. 98). Australia has, in addition to the Commonwealth government in Canberra, two territory governments, six state governments, and about 700 local governments. All three levels of government, federal, state, and local, have employed ICTs to address the "tyranny of distance" (Blainey, 1967), a term modified and used for nearly 40 years to describe the isolation and disadvantage experienced by residents in remote and regional Australia. While the three levels of Australian governments have been working co-operatively since federation in 1901 with the federal government progressively increasing its power over that time, their agencies and departments generally maintain high levels of separation; the Queensland Government Agent Program is the exception.

## BACKGROUND

Competition between the levels of government and between departments, driven largely by economic rationalism and corporatisation of government, has increasingly focussed on the efficient delivery of services and this is where the influence of ICTs has been most noticeable. In the words of the current federal auditor-general:

*[T]he necessary closer links brought about by technology, and the immediacy demanded by the public for delivery of services irrespective of which government is responsible, bring into sharper focus the need for better project governance and accountability. Particular emphases are being placed on responsiveness of service delivery and overall performance of government.* (Barrett, 2003)

While providing the means of reducing costs and equalising the service delivery opportunities across the nation, the use of ICTs are challenging the established structures of government institutions, agencies, and their bureaucratic procedures by opening them up to interdepartmental and private sector competition. The improvements in communications have led to changing community expectations of government, described by Botsman and Latham (2000) as "the enabling state, people before bureaucracy."

The state of Queensland covers an area of 1.7 million square kilometres accounting for almost 25% of the total land area of the Australian continent; it is seven times the area of the United Kingdom, more than twice the size of Texas and five times larger than Japan. With 3.8 million residents, and more than 35% of the population living outside the State's southeast corner, Queensland is the fastest growing and most decentralised state in Australia (Pop. 20 million). The distance between the state capital Brisbane and the northern boundary in the Torres Strait is more than 2000km. Providing government services in the sparsely populated remote regions is expensive, many have only been retained due to adaptation and technological innovation. Examples starting from 1929 include the pedal-powered short-wave radio and the Flying Doctor service, the high-frequency radio School of the Air, 1951, and the introduction of an integrated whole of government Intranet using 16 bit processor and satellite technology in the early 1980s.

## QUEENSLAND GOVERNMENT AGENT PROGRAM

Current ICT innovations can be found in two Queensland government initiatives. The Queensland Government Agent Program (QGAP), uses a "one-stop-shop" approach to provide a wide range of services for client populations dispersed over vast rural and remote areas (Kelso & Shepherd, 2002), and the Smartservices Queensland project provides "…anywhere, anytime access to government services" (Queensland Government, 2004). At its inception there were similarities between the QGAP model in Queensland and a similar scheme in Nebraska. In a time of rural downturn, government partnered with primary industry support networks to retain services in rural communities (Arber, 2005). QGAP combines a variety of service delivery models, the most recent of which is called Smart Services. The Smart Services program uses ICTs to, "… provide Queenslanders with a "front door" to government transactions, information, and referrals through the internet, phone, and face-to-face customer service." (ibid). Smart Services caters for the whole of Queensland, metropolitan, regional, and remote. The Smart Services program was developed out of an earlier initiative called Access Queensland. A strategy statement for that earlier program (Access Queensland, 2000) describes a range of applications including:

- A farmer west of Longreach accessing information relating to salinity of property and booking an inspection from local inspectors in one interaction
- An Aboriginal artist in Cape York through one point of contact and one interaction being able to register her business access her business "start-up" kit and enroll for an upcoming business training course
- A householder paying ambulance subscription; car registration; and housing repayments in one interaction at one location
- A New York resident booking a permit for a Fraser Island camping holiday
- A retiree registering for a seniors card and associated government concessions

The examples previously used focus upon bridging significant distances; Longreach is more than 700km from the coast while Cape York is more than 2000 kilometres from the capital city. The facility provides the ability to make multiple transactions across a single counter. However, it is probable that the New York resident would have faster access to the Web site than a remote Queenslander, as the level of service can be diminished in remote areas because of the lower download speeds of the existing copper wire telephone network (the current legislated minimum is 26.4 kpbs). Metropolitan and high-density population centres enjoy higher service levels through broadband, wireless, ISDN, and cable services. In many remote areas, one of the few high speed public access points to the Smart Services Web sites are available through the QGAP office with its dedicated data connection.

QGAP agencies are one-stop shops managed under a state government program where people can conduct all government business or obtain information. The largest QGAP outlets offer in excess of 400 specific services covering all three tiers of government. ICTs are central to this availability of services in providing internet and intranet access across the normally restricted internal and external boundaries dividing Federal, State and Local Governments and their departments. QGAP officers can facilitate a range of services including vehicle registrations, wills, estate matters, rent collection, birth, death, and marriage certificates, wildlife and environmental permits, liquor permits, insurance and ambulance subscriptions, and workplace health and safety issues. In many ways, this single shop-front approach offers the same level of service access afforded to city people. In some ways it is a superior service because it can be delivered across a single counter rather than having to visit each separate department or agency. QGAP staff are selected for and supported in delivering customer focussed service and will generally provide assistance or advice on virtually any government problem or query, even in cases where it is not a paid service function. The Queensland Transport Department has been the greatest user of the service accounting for about 70% of all work but all departments have benefited by being able to provide greater access to their services in remote communities. An example of the benefit is provided by Police and other emergency Services which are often single officer stations in remote locations. The obvious problem is that time spent in the field is time away from the front counter. The introduction of a QGAP allows the officer a release from clerical duties to spend more time on operational matters.

General QGAP enquiries account for 30% of activities, transactional services such as licences and permits 60% and other services the remaining 10%. Common requests for federal government information include immigration, taxation, and Medicare and both state and local government provide information on counselling services, tourist information, commercial advice, and wildlife management. As the federal government does not maintain service centres outside of the state capitals or provincial cities the QGAP is often the only official presence representing the federal government in many isolated regions of the state. QGAP has achieved high community support through its convenience in transacting government business and the

high level of service offered by its staff. Locals travel shorter distances to transact government business although in many cases this is still significant with journeys of 200 kilometres each way not being unusual.

The majority of information services result in some form of referral to another agency or department and for many clients accuracy of such information or personal service had been difficult to obtain in the past. ICT interconnection across departments and agencies is unique to QGAP and enables QGAP officers to obtain information for a client as well as assist with the referral where needed. This is a major public relations benefit for government as a whole. QGAP is supported by QDIAL. This is a free call telephone service which receives in excess of 1500 calls per month. The federal government's equivalent, CountryLink, receives over 3500 calls within Queensland per month.

Queensland government departments and agencies participate in QGAP as either a lead department or a user department. Lead departments manage the individual QGAP centres, control the assets such as buildings and ICT infrastructure and employ the staff. The largest QGAP agencies have access to nearly all government intranet sites at varying levels and can conduct business across the whole of government. User departments pay the lead agency for each transaction service. A common example would be where Queensland Transport provides staff and dedicates an office with QGAP signage and computer terminals. QGAP will then train the operator to cover a range of up to 420 separate transactions for a variety of other state, federal or local government departments. In some centres the QGAP facility is staffed by arrangement with local government or a private provider. In the cases of a private provider access to services is extended past the normal government operating times. One example is where a private provider opens from 6 a.m. to 9 p.m. seven days a week 363 days per year.

The QGAP access to multiple departmental intranets is unusual for the public sector in Australia. As a result of the separation between federal, state, and local Governments it is unusual to find a one-stop-shop approach enabling three levels of government service delivery. Due to political and bureaucratic reasons, for the majority of the 20th century there were clear divisions between the three levels of government in Australia. There were also clear divisions between departments within governments. By combining the duties and services of three levels of government, QGAP is providing a model for governance which is based on community need rather than departmental politics; it is increasing flexibility, expanding access, and reducing costs.

QGAP and smart service have exploited opportunities created by cheap powerful ICT equipment. Access to the government intranet systems enables an agent in a regional community to enjoy the same levels of access to head office as their metropolitan cousins. This has had some interesting outcomes. In the case of some QGAP personnel who, in delivering services for a number of governments, have come to see themselves as service "brokers" for their immediate community rather than as servants of the government which employs them.

Modifying existing services for delivery via ICTs has resulted in some services being available in a more economic and flexible format. Although these initiatives have been accompanied by the closure of a number of individual departmental offices and their replacement by a single "shop front" outlet, the combination of well trained counter staff with high speed ICT access to the whole of government has actually raised the level of service in those communities. A further unintended outcome has been the recognition by governments of the need to adapt to the new service requirements and aspirations of non-metropolitan citizens. There are similarities between QGAP and Liverpool City Council in the UK which have one-stop shops and an electronic "Pod Squad" http://www.egovmonitor.com/node/1189 . However, the UK initiative is driven largely by technology whereas the QGAP model is initiated by social need, underpinned by a fee-for-service structure which is made possible by the application of efficient ICT.

## ICTS CONNECTING THREE LEVELS OF GOVERNMENT

Federal and State governments have committed to ensuring that all communities, including those in rural and remote areas, have fair and relatively easy access to the same range of services available to people in the larger urban centres (Sorenson, 2000). Many of the administrative arrangements for QGAP and Smartsite arose out of the changes associated with reforms which were adopted in the 1980s in the Australian public sector, under a number of headings including, new public management, managerialism, market-based public administration, and entrepreneurial government. The managerial agenda across all of these is remarkably similar on the direction of reform and focuses on ways to improve the efficiency and effectiveness of the public sector. All are heavily reliant upon the efficiency gains delivered by the widespread adoption of ICTs. However, those changes have resulted in some fundamental challenges to the traditional public service structures.

Through the innovative application of ICTs, QGAP and Smartservice have demonstrated a whole of government approach which has resulted in:

- Commercialisation of government business and service-provision
- Increased liberalisation or competition within and between departments and agencies
- Contracting-out of government services to private sector providers
- Contracting-in, from the private sector to provide services
- Competitive tendering for the provision of services between departments, and
- Purchase of supplies or services which government agencies used to provide themselves.

More services are delivered in a networked fashion and levels of accountability and efficiency have improved (Kelso, 2001, p. 79-81). A new kind of public servant is emerging, one which can work across local, State and Federal government and deliver services in the most efficient manner. QGAP was originally a response to an economic rationalist overreaction which closed government services in remote areas because they were perceived as loss-makers. The QGAP model now runs 68 sites at a cost of approximately $3 million to return $27 million in profit (2004 financial year).

## FUTURE TRENDS

Efficient ICT internet and intranet interconnection of QGAP has enabled geographically isolated government agents to interact with a much wider cross-section of departments and agencies than their head-office or metropolitan counterparts (Kelso, 2003, p. 210). In many cases, these interconnections span across three levels of government; this is unique in the Australian political system. As Barrett (2003) points out, "Citizens should not necessarily have to deal with any number of government departments, perhaps at federal, state and local levels, in order to progress a particular course of action. One important aim of joined-up government is to integrate government services with the primary focus being on the needs of the citizen." Added to this is the capability provided by ICTs for governments to audit and account for expenditure and income in more cost-efficient and timely ways than was possible using the traditional public service reporting models. As the uptake of ICTs improves, the traditional communication model of distributing information out from the administrative centre has evolved to now include an interactive element where citizens and consumers have 24 hour electronic access to decision makers and service providers. Communities can now influence governments through e-democracy initiatives such as online petitions to the parliament (Qld. Government, 2002) and Community Forums. There is, however, a fundamental benefit driving the changes to the systems, the timely online payment of bills and licences is an attractive reason for governments to ensure that all citizens are connected and transacting in the most efficient way possible.

## CONCLUSION

The QGAP initiative takes the existing technological systems used by different government departments and combines them into a more efficient and effective system. The success of the QGAP initiative can be traced to a number of factors. The first is that for many isolated residents, any level of service by government is better than no service at all. The second factor is that "joined-up" government facilitates higher levels of accountability. Finally, a one-stop shop approach using an interconnected Internet and intranet system has, for the first time, provided the opportunity for nearly all government departments to provide services to isolated residents, that is, services across all three levels of government. Most importantly, the effective and efficient use of ICT has demonstrated how services which were once considered uneconomic can be delivered in a manner in which they return a profit to government.

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## KEY TERMS

**Digital Divide:** The divide between the technologically well-serviced urbanised coastal strip and the lower service inland and "outback" regions. In a large part of Australia, this also follows the "great dividing range" of mountains which run just inland from the populated east coast and is the division between the "city" and "the bush."

**Enabling State:** A term used by Botsman and Latham (2000) to describe a model of empowerment by connecting individuals to governments and reducing the influence of bureaucratic gate keeping.

**Isolated:** In Australian terms a person living more than 100 kilometers or more from their nearest town or neighbour would be considered isolated.

**One-Stop Shops:** A shopfront outlet delivering services for three levels of government.

**QGAP:** The Queensland Government Agent Program.

**Smart Services:** The Queensland Government initiative designed to deliver services through a variety of electronic systems.

**Tyranny of Distance:** A term coined by historian Geoffrey Blainey which explains the influence of distance upon the development of Australia.

# Internet Voting

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## LEGAL REQUIREMENTS AND TECHNICAL SOLUTIONS

Internet voting denotes electronic voting (e-voting) systems that allow votes to be cast using the Internet. There are, however, other types of e-voting, like those based on optical ballots, those using computers without remote connection or those sent by phone (Kersting, 2004; Tula, 2005). All these systems can be used in political elections or private ones (binding examples of Internet voting: the 2000 Democratic primary in Arizona or an election in a chapter of the Institute of Electrical and Electronics Engineers in 1997).

Since Internet voting will be applied to a democratic framework, it should offer the same conditions required in traditional elections (Cranor, 1997; Gritzalis, 2003; Prosser, 2004; Trechsel, 2005). Therefore, the suffrage must be at least universal, free, equal, and anonymous (Mitrou, 2002).

*Universal* voting means that any person entitled to take part in an election should be able to cast a vote, and this in an authenticated manner to avoid impersonation by malicious third parties. An identification procedure is required to *authenticate* the voter, which entails more difficulties than the traditional exhibition of a paper identification (ID). There are at least three approaches to identifying the user of an Internet voting system: through something the user *knows*, the user *is* or the user *has* (Schneier, 1996).

Knowledge of a username and the corresponding password is the most widely used identification procedure ("something the user knows"). It has the advantage of simplicity and usability by a vast majority of users. Nevertheless, it has two major problems. This system makes vote selling very easy, since the voter only needs to send his or her username and password to the buyer. The second problem is the trade-off between security and usability. Reasonable security requires long passwords, which increases the risk of typing errors by voters.

The second approach is to use a public key infrastructure (PKI) (Adams, 1999). In this case, every voter has a key pair of a public-key cryptosystem ("something the user has") and that public key is certified, for instance, by the electoral authority. Since the voter is authenticated with his or her digital signature, this system requires a high protection of the voter's private key to avoid its unauthorized use by another citizen. A user-held cryptographic token or smart card is a good solution to store and operate the user's private key, because such hardware devices can be regarded as being tamperproof in most practical situations.

Biometric identification is the third approach to identification ("something the voter is"). It is the oldest form, because physical recognition is a biometric procedure used not only by humans but also by animals. The voter uses a device that obtains a biometric measurement; for instance, a fingerprint. This measurement or pattern is sent to the authentication service that verifies whether it matches the data previously stored about the voter. Important issues when using biometrics to authenticate a voter are: (1) to ensure that the biometric pattern came from the right person at the time of the verification; and (2) to ensure that the collected pattern matches the one stored for the voter (both patterns are likely to be slightly different due to measurement errors or variable biological conditions, so exact matching is unlikely even if both patterns correspond to the same person).

A combination of several of these three identification approaches is a sensible solution.

*Freedom* is another important requirement that may be jeopardized if the voter receives inaccurate information

during the voting procedure. It should be realized that information technologies greatly facilitate these kinds of inputs (i.e., political pop-ups). The voter should also receive complete, accurate and understandable information about the operation of the Internet voting system. Therefore, training campaigns and on-site assistance are required.

Internet voting, although it can also be used in controlled polling stations, is particularly attractive in a distributed scenario where the vote is allowed from any computer (i.e., from home). However, a distributed scenario entails additional dangers because it becomes possible to create a voting market, even a massive one, or to practice extortion upon some citizens (i.e., the employer upon employees). An Internet voting system not used in official polling stations can hardly eliminate these problems, and the solutions—criminal protection or a reduced application to some specific groups of voters (i.e., citizens living abroad)—may not be enough from a democratic point of view. This is, therefore, one of the key problems of Internet voting (Jefferson, 2004). However, some countries currently admit postal voting, which is subject to similar dangers; thus, Internet voting could also be acceptable to those countries. It is actually a social and cultural problem.

Additionally, freedom in voting requires adapting to the electoral tradition of each country. An electronic vote should not reduce or eliminate the idiosyncrasy of an electoral system. For instance, blank votes and especially null votes cannot always be analyzed as voter's errors. They are part of political behavior and, if they are allowed in traditional systems, they must also be included in any Internet voting procedure (Barrat, 2004).

An *equal* vote requires that voters and the candidates receive a correct treatment. Therefore, the voting system screen should be designed to avoid any discrimination. The order of the political parties and their logos must be carefully established. It is also compulsory to have a simultaneous exhibition of all candidates, since using multiple screens would benefit the first ones. On the other hand, the system must avoid multiple votes by the same voter and should not exclude a citizen legally entitled to vote. Finally, equality requires a system that can guarantee the accuracy of the results; in particular, it should be impossible to change or delete a vote already cast. While perfect accuracy will avoid these situations or, at least, will detect and solve them, a system is said to provide partial accuracy if it is able to detect manipulation, but unable to solve it.

The digital signature is a good tool to provide these accuracy and integrity properties (Fujioka, 1992). The digital signature yields proof that the vote has been cast by a valid voter and has not been modified afterwards. Specific storage devices that do not allow information to be erased once it has been written can also be used. Nonetheless, security properties of an Internet voting system are ultimately dependent on the software implementation; therefore, the security properties of a system must be auditable (*vid. infra*).

The *anonymity* of the vote means that nobody, not even the electoral board, can link the content of one vote with the person who cast it. The system should also avoid the disclosure of partial results. The traditional procedure achieves these goals in a very simple way: a ballot (with or without envelope) is inserted into a transparent urn that can be controlled by any voter until the final tally. An Internet voting system cannot offer a similar procedure, since anonymity depends on the software source code and a citizen without technical knowledge cannot check it.

The anonymity of the vote and the secrecy of the intermediate results are usually assured by the encryption of the vote with the public key of the electoral authority (Benaloh, 1986; Chaum, 1988). However, the private key used to decrypt the votes protected with the public key is a very sensitive piece of information. It is not desirable that this key be possessed by just one person because that person can be an easy target for coercion. A usual strategy is to split the knowledge of the key between the members of the electoral board using a cryptographic threshold scheme that requires a pre-set number of board members to recover the private key (Shamir, 1979). If the number of co-operating board members is less than the threshold previously fixed, they do not obtain any useful information about the private key.

On the other hand, there are two basic methods to guarantee privacy and anonymity in an electoral procedure: mixing (Chaum, 1981) and homomorphic encryption (Benaloh, 1986).

In the first one, the voter obtains an authorization token issued by an electoral authority. There are several methods for obtaining the token anonymously, so that the election authority cannot later link the token with a particular voter (Sako, 1995; Nurmi, 1991; Fujioka, 1992). In the second step, the voter sends his or her vote and the authorization token using an anonymous channel implemented with a set of servers—"mixing servers": each server receives the votes, permutes their order and reencrypts and sends them to the next one. Once the last mixing server has sent the votes the tally process begins. Every vote is decrypted and the server verifies that the authorization token is valid. These mixing server operations are complex and current research focuses on obtaining a mixing method that can be efficiently and universally verified.

In the homomorphic protocol, the voter encrypts his or her vote and computes a proof that demonstrates the correct construction of the vote. The proof does not

reveal any information about the vote. The voter sends the encrypted vote and the proof to the election authority. All the encrypted votes are multiplied together, and decryption of the final result yields the sum that would have been obtained by adding votes in the clear. The key used to decrypt the vote is divided among several authorities that must co-operate in the decryption process to obtain the final result. There are methods to check the accuracy and correctness of the process so that, in this case, universal auditability is guaranteed. However, the computation of the proof to demonstrate the correct construction of the vote is complex, which can be a problem when the voter's computing device has restricted computational power (as is the case if the voter computes his or her vote using a smart card). A second drawback is that the ballot format is limited, so that it does not allow complex voting procedures (i.e., write-in candidates).

Technology is a key factor, but it is not the only matter of concern. We have already seen some legal aspects that must be addressed with the technological ones. Essential elements of any voting procedure, like the correct identification of the voter, the anonymity of the vote and the correctness of the tally, are not easy to verify in Internet voting, whereas they are straightforward in traditional systems. An effort to improve *auditability* in Internet voting is needed (Riera, 2002; Muralt, 2003). Nowadays, the only really accurate option is a complete software audit. Some systems give a receipt that could increase the voter's confidence. When the system is used in a polling station, there can be a paper receipt with several options: a receipt with only participation data, a receipt with the content of the vote that could be given to the voter so the voter can insert it in a traditional urn or, finally, a receipt with the content of the vote shown only to the voter. In the latter option, the voter sees the receipt, checks that its content is correct, confirms the vote and finally the machine itself puts this receipt in an internal urn. If the system is not used in a polling station, no receipt with the content of the vote can be issued because this solution could facilitate voter coercion. Some technical solutions give the voter a code for his or her vote, and afterwards the electoral board publishes them together with the tally.

However, the solutions based on receipts do not guarantee individual nor universal auditability. Paper receipts certainly allow a manual tally to be computed to confirm the electronic one; in practice, this option is seldom used, because it severely diminishes the speed attractiveness of electronic voting. In the case of a receipt with a vote code, the citizen must make confidence to electronic data that he cannot check. As said above, performing a complete audit of the voting software is the most rigorous approach. Therefore, at least from a legal point of view, the implementation of the voting system should be totally transparent to allow any citizen, and not only the electoral boards, to check the code.

The system should be audited before, during and after the election. Before the election, the devices and the software used must be audited and sealed so that it will be detected if they are tampered with. The use of open source code should be viewed as a good practice, because security experts and the entire community could help to detect and correct errors. During the election, all actions must be logged, because this information will help to find and repair any errors. Finally, the seals and the information recorded must be verified after the election to make sure that no abnormal circumstance happened.

## SOCIO-POLITICAL FRAMEWORK

From a socio-political perspective, the use of Internet voting raises several issues for debate. We can differentiate those arguments against the use of Internet voting from those in favor of it.

Among the former, three main arguments are discussed: first, criticisms about the security and reliability of the Internet; second, problems that arise connected to the digital and social divide; and third, arguments related to the changes in the process for casting the vote itself.

The digital and social divide stands out as the most important issue (Norris, 2001). It focuses on the differences of technology use among citizens. So it is not just about how many citizens could have Internet access or which is the percentage of citizens that use computers (Demunter, 2005). The digital and social divide goes further: Internet voting assumes that citizens are not only able to use the Internet for voting, but also to become instructed and informed on the options/candidates they can choose from. Comparative data from various surveys shows a well-known picture where men have greater access to the Internet that women; younger people than older; richer than poorer; highly educated than those with lower levels of education and so forth. Thus, the concept might be widened, involving not only technological issues but socio-economic, cultural, educational and legal aspects.

Beyond the digital divide, there exist other arguments against Internet voting related to social perception. From that point of view, it is said that people are afraid of using new technologies. Some scholars argue that *off-line* people—those excluded or self-excluded from information and communications technologies (ICT)—do not feel confident enough to use Internet not just for voting, but also for anything else (e.g., using credit cards or shopping online). Such a *technophobia* may seem a bit

irrational, but is the consequence of most people being unable to understand how ICT work. In other words, people know *the existence* of those technologies, but do not know *how* they really work. For instance, while in traditional voting systems citizens can *see* both the ballot and the urn and can in principle attend the counting process, using Internet voting prevents them from doing so (Reniu, 2005; Barrat, 2004a).

For a significant number of citizens, the moment when votes are cast is still a strongly symbolic moment. Such citizens are reluctant to surrender the possibility of social interaction with other people in exchange for a number of alleged advantages inherent to casting the vote from home. Indeed, the moment of casting the vote is understood as a way of reinforcing socio-political identification with the community and implicitly renew the *res publica* social contract. In this respect, Internet voting is blamed for promoting strictly private behaviors, whereas the ultimate goal of elections is to elicit the general will.

On the other hand, arguments in favor of Internet voting are not limited to comfort for voters. The main positive reasons refer to increased participation enabled by information technologies both in terms of quantity and quality (Braun, 2005). On one side it is said that Internet voting provides more possibilities for citizens to take part in elections, especially for those living abroad, in isolated areas or experiencing difficulty to reach a polling station due to illness. Moreover, Internet voting stimulates people to participate because its update effect on the electoral process will result in a more informed citizenship. On the other side, the quality of participation will increase thanks to the vast amount of information available on the Internet that will help voters attain a well-informed opinion.

Last but not least, we have to take into account the economic and political benefits. Using Internet voting will not only reduce the cost of traditional elections—which require a substantial human and logistic deployment—but also will help environmental sustainability by reducing the use of paper. In addition, Internet voting allows quicker tallies that result in a reduction of uncertainty in electoral processes and thus reinforce the democratic legitimacy of the system. In conclusion, as several public opinion surveys point out, Internet voting will provide citizens with a fast, comfortable and easy-to-use way to take part in the governing process (Trechsel, 2005a).

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## KEY TERMS

**Blank Vote:** A valid vote that does not choose any candidate or, in case of a referendum, any of the offered options.

**Client Voting Platform:** Electronic device used by the voter to cast a vote. It can consist of hardware only or both hardware and software.

**Digital Divide:** Sociological concept that underlines the different approaches of the population to the ICT. Both the access to these technologies and the know-how for using them emerge as key elements of a new social gap that depends on several factors such as country, economic status, age or gender.

**Individual Auditability:** The property whereby every voter can check that his or her own vote has been correctly cast and managed.

**Manager Voting Platform:** Electronic devices that manage the election and offer three basic functionalities: the reception of the votes, their tally and, finally, their publication.

**Null Vote:** A vote cast in an incorrect way (i.e., by introducing two different ballots in the envelope, introducing a non-official ballot, etc.). This vote can be cast inadvertently, but sometimes there are citizens who wish to cast an invalid vote to protest against something.

**Universal Auditability:** The property whereby anyone can check the whole electoral procedure and confirm the correctness of the final tally.

# IT Management Issues in Digital Government

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## INTRODUCTION

A common thread among municipal governments is that they harbor a variety of enterprises under one roof. For example, police, fire, public works, social services, assessor, recorder, health services, human resources, and so forth. may all be constituent parts. They all provide services to the public, and many of these services are rapidly acquiring an online orientation (i.e., they are becoming e-services). Since they are all part of a single governmental entity, there is a need to review these online offerings to assure that the level of service provided is satisfactory and that there is a common look reflective of the parent political entity. This is discussed in the section titled "E-Government Services Review". The common look or adherence to standards on Web sites can be facilitated by having appropriate IT governance for the disparate departments in the form of a chief information officer (CIO) who represents the interests of the parent political entity on an overall basis. One mechanism the CIO can use to invoke an IT vision for the County is to develop a strategic IT plan that the operating departments can then use as a guideline to plan their IT actions. This is discussed in the section of the article titled IT Governance and Strategic Planning. In the development of e-government services, as well as other systems projects, care needs to be taken regarding a number of important factors in order to assure that development work is done within time, cost, and quality constraints. This is discussed in the section of the article titled "System Development Guidelines".

Los Angeles County has an annual budget of close to $17 billion, encompasses about 30 major operating departments, and expends more than $700 million each year on information technology operations. Providing review and counsel to this effort is a 10-member Information Systems Commission, of which the author has been Chairman for the past 10 years. The Commission has concerned itself with such topics as e-government services, IT governance and strategic planning, and systems development. This article presents managerial insights drawn from this experience that should be applicable to large public agencies across the country.

## BACKGROUND

The growth of government e-services is accelerating. Not only are more of the traditional government services becoming available online, but the level of sophistication and maturity of these services is also increasing. The opportunity exists for government services to make a paradigm leap in availability and usefulness. Services should become more oriented toward user needs and life events. However, such efforts require guidance and review in order to assure that they are going in the right direction.

This article lists various services and then indicates certain aspects that a review might cover. In addition, it discusses the potential evolvement of such offerings to become more process and problem oriented. Coordination between services, the need for a single point of entry, and a common look are other necessary attributes for the growth of e-services. Toward these ends, there is a vital role for the CIO function and for a Strategic IT Plan. Furthermore, the development work that will need to be done in the e-services arena can benefit from the application of best practices of systems development.

## E-GOVERNMENT SERVICES REVIEW

Most public agencies offer a considerable number of services to the public via the Internet. Periodic review of these services will ensure that the public is deriving maximum benefits from e-government. Such review would focus on the e-services offered by various operating departments. Specific transactions could fall into such categories as "non-interactive," "partially interactive" (i.e., downloading materials and then later completing the transaction in a non-electronic mode), and "interactive" (i.e., completing the transaction online). The nature of the transactions offered indicates the maturity level of e-government. Lam (2004) offers a categorization of maturity based on whether the transactions are informational, transactional, process integrated, or service integrated. Siew and Leng (2003) propose an alternate scheme based

on whether services describe, explain, consult, or connect. Los Angeles County seems to be entering stage three of both of these classification schemes.

Some examples of Los Angeles County e-services follow, divided into two groupings:

1. Non-interactive information available to the public, including:
   - Job opportunities
   - Financial aid programs (qualification and how to apply), including food stamps, medical services, and welfare
   - Locations of correctional facilities and inmates
   - Fees for service, building permits, bid results, and invoice status
   - Road closures, flood control, and rainfall
   - Waste management and recycling
   - Rosters of public officials
   - Election results
   - Procedures for document recording
   - Voting information, application for absentee ballots, polling place locations, sample ballots, and so forth.
   - Study guides for position examinations
   - Property assessment data and home sales
2. Partially interactive and interactive applications, including:
   - Fictitious name searches
   - Sample tests for positions
   - A wide variety of forms in PDF format that can be filled out online or downloaded and then printed and mailed in (search for forms can be done by keywords, category, or form number)
   - Web user inquiries answered by displaying responses from a database, if available, or otherwise routing the inquiry to appropriate parties for response
   - Application for, payment, and receipt (via printing) of transportation permits
   - Personalized traffic reports (which allow the public to define a travel route and be paged if an incident has occurred on that route or if there is congestion)
   - Crime tip input
   - Probation reporting
   - Complaints and commendations
   - Filing of business property statements
   - Emergency requests for birth and death certificates
   - Ordering of authenticated maps

Although these services cover a wide spectrum of activity, they are not as yet fully integrated with each other, and there is also need for further development based on user needs rather than organizational structure. Borins (2004) reports similar findings in other organizations. Pan and Lee (2003) advocate the use of customer relations management techniques to achieve a holistic view of the organization's customers in order to better serve their needs, deliver greater value, and ultimately increase customer retention. According to Boyle and Nicholson (2003), there should be a single point of contact for any member of the public to access any government service.

The economic benefit of such e-services to a governmental agency can be reflected in a decrease in the number of telephone calls that the agency's employees need to handle (thereby achieving labor cost savings), a decrease in the number of people showing up at the agency's offices for over-the-counter transactions (more labor cost savings), cost decreases realized from the consolidation of certain agency operations because of a decrease in the volume of transactions at each of them, savings in postage and handling, greater accuracy, etc. From the public point of view, time is saved through not having to physically go to agency offices, lower fees for some services, accessibility of services that were previously not available in a non-electronic form, 24/7 availability of services, etc.

From an expense standpoint, the cost of building, implementing, operating, and maintaining such e-services applications have to be considered. In some cases, certain of the benefits and all of the costs are quantifiable. Research results indicate that often just the quantifiable aspects of the benefits easily pay for the costs of the applications in two to three years, thereby justifying the investment on that basis alone. A payback period of two years is generally deemed excellent for project investment. Borins (2004) indicates that there are strong financial incentives for government entities to switch users over to the Internet. Based on several economic analyses that are available in Los Angeles County, this would appear to be borne out. For example, a Simple Permits System for Los Angeles County that cost $175,000 to develop (with annual maintenance costs of $5,000) has engendered annual labor cost savings worth more than $150,000.

Specifically, with regard to the e-services listed previously, the E-Government Services Review conducted by Los Angeles County addressed the following questions and areas of concern:

1. What services and transactions are being offered or are planned to be offered
2. What forms can be downloaded
3. What databases can be directly or indirectly (i.e., by use of an intermediary) accessed by the public

4. Are services organized around topics and functions or around organizations
5. What is the level of security and privacy of transactions, including the use of electronic signatures and follow-up on fraudulent transactions
6. What suggestions have been put forth for services not offered or expected to be offered
7. What is the fee structure for services, and what is the rationale for the structure
8. Have the following issues been evaluated with regard to Web sites?
    a. Information content and orientation: Does the architecture provide quick and user-friendly access to information and services? How easy is it to discover what services are offered and how to access them
    b. Accessibility, navigability, and reliability: Do the links work
    c. Feedback mechanisms and the handling of e-mail sent to the site by users: How efficient are these processes
    d. How up-to-date is the material on the Web site
    e. Has the Web site identified its audience and built the site to serve their needs
    f. Are there clear "how-to-use" instructions, help facilities, and site maps
    g. Are there consistent formats, good page design, and meaningful titles
    h. Is the speed of response adequate, and do pages download efficiently
    i. Is the URL of the site and its pages clearly visible and memorable
    j. Can the site be readily found using search engines

Recent other assessments of public Web sites include Cullen and Houghton (2000), Curtin, McConnachie, Sommer, and Vis-Sommer (2002), and Ho (2002).

## IT GOVERNANCE AND STRATEGIC PLANNING

The Los Angeles County Review suggested that there was a need for greater standardization among constituent Web sites. A similar finding in other venues has been reported by McGinnis (2003). He indicates that individual government agencies have tended to create their own Web sites independent from one another rather than with a strategic plan for future integration from the outset. This applies to Los Angeles County as well, and it has been independently reported for other entities by Atkinson and Leigh (2003).

The common look or adherence to standards on Web sites can be facilitated by having appropriate IT governance for the disparate departmental entities in the form of a CIO who represents the County on an overall basis. It is has been fairly well established by now that most large-scale public organizations need the services of a CIO. Pervasive use of the CIO designation is reported by Ingraham, Joyce, and Donohue (2003) and Borins (2004). Issues inherent in the establishment of an Office of the CIO in a public entity are described by Freeman (2004). The question of standards in relation to Web sites is discussed by Tambouris and Spanos (2002).

Once general support has been established for the CIO concept within a city or county, a question may arise over the reporting responsibilities of the CIO in the chain of command. The arguments that may be used in favor of the CIO reporting directly to the CEO (usually a mayor, a county executive, or, as in the case of Los Angeles County, a Board of Supervisors) include:

1. The position of CIO reports to the CEO or its equivalent in practically all major corporations and governmental entities
2. The CIO should not be burdened with another layer of management (e.g., a department head) between the CIO and the CEO. The CIO inevitably has to interact with other department heads on IT matters, and it would be awkward to have the CIO report to one department head while having to negotiate with other department heads
3. The CIO must not have any conflict of interest, real or perceived, with regard to IT. If the entire mission of the CIO's Office is to perform the functions of County CIO, then there can be no conflict of interest. However, if the CIO reports to an existing department, there can and will be conflicts of interest
4. The government agency will not be able to attract a truly qualified person to the CIO position unless that person has sufficient freedom to operate. This includes the freedom to confer with the CEO

The IT vision of the CIO can be documented in a strategic IT plan, which indicates the direction to be followed at various phases and in all elements of the IT endeavor. The document for Los Angeles County is called the Integrated Business Automation Plan, and it covers areas such as software development process (e.g., all application development should be WEB-enabled); local area networks (e.g., there should be a standard LAN enterprise environment with Windows NT as the preferred operating system); common collaborative software (e.g., the preferred software would be the

Microsoft suite of products); enterprise networking (e.g., there should be a ubiquitous communications capability among all locations via a new modernized network); PC workstations (e.g., each employee should have access to email, internet/intranet, collaborative software, etc., connected to a LAN); database technology (e.g., to be SQL compliant); and standards for Web development (e.g., required linkage to the County portal).

In Los Angeles County, the Integrated Business Automation Plan is updated annually. It indicates the expenditure for IT efforts, including positions, services and supplies, telecommunication, contract services, hardware and software, leases, fixed assets, and other miscellaneous expenditures. Year-to-year comparisons have shown a continued increase in the number of networked computers and a reduction in the number of stand-alone units. Increased activity in Internet/intranet application development, data warehousing, document management, video conferencing, and LAN expansion are other highlights. The plan is a high-level operating document for the use, management, and development of information technology resources, and it focuses on how IT resources will be allocated and used.

## SYSTEMS DEVELOPMENT GUIDELINES

As reported by Globerman and Vining (1996), the literature on the management of IT projects has noted a high rate of cancelled projects, delays, cost overruns, and inadequate system performance. In the development of e-government services, as well as other systems projects, care needs to be taken regarding a number of important factors in order to assure that the development work is done within time and cost constraints. Among these factors are acceptance testing standards, contract specifications, contractual binding arbitration and cost reimbursement clauses, management dispute settlement mechanisms, requirements specifications, project management, resources for systems implementation, software examination, a development lifecycle that is as short as possible, and independent quality assurance. A complete description of this may be found by Freeman (1996). It has been seen in Los Angeles County that neglect of these factors can lead to disastrous consequences. However, public sector practitioners, such as those in Los Angeles County, have attempted to learn from their experiences and to develop best practices accordingly. Some examples follow:

1. Parallel acceptance tests (with appropriate documentation) for systems that replace existing applications
2. Independent review of specifications before issuance of a request for proposals (RFP)
3. If at all possible, a contractual requirement for binding arbitration to handle disputes, with an agreed-upon penalty structure
4. A graduated system of dispute settlement in both the contractor and user managerial chains
5. An adequate mechanism for change control
6. A standard for project management, including well-defined project review cycles
7. Assignment of a project manager by the public agency who has had experience with systems of the same dollar magnitude and complexity
8. Budgeting of sufficient resources needed to accommodate the implementation phase of the system. This includes user training, dual operation, conversion, physical facility changes, and documentation
9. Making training funds available not only for the trainers but also for the trainees. This would include overtime or replacement help in order for employees to do their regular jobs while they are being trained

## FUTURE TRENDS

Borins (2004) indicates that many public CIOs believe that government and democracy will become largely electronic within ten years' time. The discussion of the economics of e-services in this article provides a rational underpinning for this conjecture. Thus, it seems likely that e-government will become pervasive. This will require reorientation of existing services so as to provide one-stop shopping for all citizens for accessing all government services. These services will no longer be presented along "stovepipe" organizational lines but rather would deal with functional service dedicated to solving problems based on life events and needs. Given the massive scope of e-services in the future, the establishment of the CIO function will be necessary in order to provide standards and integration. A strategic plan can be used to provide guidance to the development efforts of individual departments.

## CONCLUSION

This article has listed a sampling of e-government services in place in Los Angeles County and has discussed these from the perspective of e-government maturity. The economic benefits of such services was described, and it was indicated that many show a relatively short pay-off period. A method of review for such services was delineated. The necessity for a common appearance for ser-

vices from a given governmental entity was shown, and the role of the CIO in achieving such a look as well as adherence to standards was described. The organizational alignment of the CIO within the governmental entity and the use of a strategic IT plan to delineate the IT vision was discussed. In order to develop systems and Web sites, certain factors must be heeded. These were described as best practices derived from the Los Angeles County experience. The information technology issues treated in this article likely have applicability to large public agencies across the country.

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## KEY TERMS

**Chief Information Officer (CIO):** Someone charged with guiding the IT effort of an entity from the viewpoint of the enterprise as a whole.

**Customer Relationship Management (CRM):** A set of IT techniques that allow for the creation of an integrated view of customers and the use of this information to coordinate services to these customers.

**E-Maturity:** The level of sophistication and complexity of government e-services.

**E-Services:** Use of information and communications technology to deliver public information and services.

**IT Strategic Plan:** A document charting the course and scope of the IT effort in an entity.

**Portal:** A single Web-based point of access for information and services.

**Universal Access:** Providing capability for online participation by all segments of the population.

# IT Security Policy in Public Organizations

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## INTRODUCTION

Today, information security is one of the highest priorities on the IT agenda. In 2003, Luftman and McLean (2004) conducted a survey of Society for Information Management members to identify the top 20 information technology (IT) issues for executives. Security and privacy issues were ranked third, after IT/ business alignment and IT strategic planning. Concept of information security applies to all the data stored in information systems or being communicated in information networks and encompasses measures applied on all layers of open system interconnect (OSI) model of international standards such as application, networking, and physical.

Sophisticated technologies and methods have been developed to:

- Control access to computer networks
- Secure information systems with advanced cryptography and security models
- Establish standards for operating systems with focus on confidentiality
- Communication integrity and availability for securing different types of networks
- Manage trustworthy networks and support business continuity planning, disaster recovery, and auditing

The most widely recognized standards are:

- **In the United States:** Trusted Computer System Evaluation Criteria (TCSEC).
- **In Canada:** Canadian Trusted Computer Product Evaluation Criteria (CTCPEC).
- **In Europe:** Information Technology Security Evaluation Criteria (ITSEC).

All of theses standards have recently been aggregated into Common Criteria standards. And yet, the information systems continue to be penetrated internally and externally at a high rate by malicious code, attacks leading to loss of processing capability (like distributed denial-of-service attack), impersonation and session hijacking (like man-in-the-middle attack), sniffing, illegal data mining, spying, and others. The problem points to three areas: technology, law, and IT administration.

Even prior to the drama of 9/11, several computer laws were enacted in the USA and yet more may come in the future. Still the fundamental threats to information security, whether they originated outside the network or by the company's insiders, are based on fundamental vulnerabilities inherent to the most common communication protocols, operating systems, hardware, application systems, and operational procedures. Among all technologies, the Internet, which originally was created for communication where trust was not a characteristic, presents the greatest source of vulnerabilities for public information systems infrastructures. Here, a *threat* is a probable activity, which, if realized, can cause damage to a system or create a loss of confidentiality, integrity, or availability of data. Consequently, *vulnerability* is a weakness in a system that can be exploited by a threat.

Although, some of these attacks may ultimately lead to an organization's financial disaster, an all-out defense against these threats may not be economically feasible. The defense actions must be focused and measured to correspond to risk assessment analysis provided by the business and IT management. That puts IT management at the helm of the information security strategy in public organizations.

## INFORMATION SECURITY THREATS

Security threats to a computer system fall into a number of classes. Some well-known *threats* focus on disclosure of sensitive information; destruction of resources, interruption of processing, damage of data confidentiality, integrity, and availability, corruption, modification, theft, removal, and accidental loss, operator input error, and transaction processing errors.

Some threats influence the availability and reliability of the site, which is usually called a denial of service (DoS) attack. The Code Red virus is an example of a DoS attack.

Code Red was programmed to overflow Web servers with data, which it did so effectively that it resulted in making a huge portion of the Internet unavailable, as sites became clogged with more data than they could process. Other attacks target the content and data of a site, as individuals seek to damage, spy, steal, change, delete, or place something on the Web site. In addition, we have to be ready to deal with natural disasters such as earthquake, flood, and fire.

The common *purposes of the intended threats* include embezzlement and financial gains, curiosity, economic espionage, economic damage, personal financial injury, illegal search for evidence, and others.

The intruders employ a wide range of tools and techniques (some of them available on the Internet). A somewhat extensive but still incomplete list of hacker's tools and techniques include (Anderson, 2001; Preetham, 2002):

- **Backdoors:** Programs that are written to infect the victim's computer and open a secret door for the hacker.
- **Denial of Service (DoS):** Programs that designed to disrupt communications, sessions, transactions, or any other kind of business activities over the network.
- **Dumping Diving:** It is a process in which a social engineer searches an organization's garbage to find valuable information.
- Reading data erroneously left on the disk.
- **Impersonation:** In this approach, a social engineer gains detail information about an employee in an organization. Then the social engineer impersonates that employee by calling the help desk or another employee to gain access to sensitive information.
- **Loss of Processing Capability**
- **Man-in-the-Middle Attacks:** An attack in which a hacker can read, insert, and modify messages between two persons/systems without either one knowing that the communication line between them has been compromised.
- **Password Cracking:** Programs written to recover passwords from data that has been stored in or transmitted by a computer system, usually, by repeatedly verifying guesses for the password.
- **Replay Attack:** A form of nework attack in which a valid communiation is maliciously repeated or delayed. This is done by an attacker who intercepts the data and retransmits it as part of a masquerade attack.
- **Sniffers:** Programs that can see the traffic going throuhg a network or part of a network.
- **Social Engineering:** The greatest single danger identified by Information Security specialists (can be particularly damaging in public organizations)
- **Spoofing:** A technique hackers employ to alter the sender's identity within a packet.
- **Trojans:** Programs that provide a perceived benefit for the victim while conduction malicious activities in the background.
- **Viruses:** Programs that are written to crash a system, consume system's resources, or transmit vital information back to the hacker.
- **Worms:** Programs that are developed to replicate themselves on a desired medium. They are an effective tool for denial of service (DoS) attacks.

There are some preventive, detective, or response defense mechanisms, but each of them is effective only to some extent. None of them is full proof, and not all of them are economically or organizationally feasible for implementation at a public organization.

The list of hacker's tools and techniques is growing as new software (operating systems, applications, common-use utilities, and file types) continue to be introduced in the organizational and personal information networks. Information Security professionals agree that these trends will continue for foreseeable future.

## COMPUTER LAWS

IT Security in public organizations must be guided by several computer laws which were enacted in the USA and which directly address specific issues of computer information privacy and protection:

- **Privacy Act of 1974:** To regulate federal government's use of private data.
- **Medical Computer Crime Act of 1984:** Sets federal criminal penalties for mi-use of medical records over telecommunications lines.
- **Comprehensive Crime Control Act of 1984:** Covered a range of computer crimes.
- **Computer Fraud & Abuse Act of 1986:** Defined computer fraud against federal interest computers.
- **Electronic Communications Privacy Act of 1986:** Covered illegality of capturing, altering or misuse of digital information.
- **Computer Security Act of 1987:** Defined security classification of electronic data.
- **Federal Sentencing Guidelines 1991:** Requires corporations to report computer crimes.
- **Economic Espionage Act of 1996:** Defined espionage against private companies.
- **U.S. National Information Infrastructure Protection Act of 1996:** Directly addresses the security of information systems and the need to protect the confidentiality, integrity and availability of information.

- **Health Insurance and Portability Accountability Act of 1996 (HIPAA):** Focused on privacy and security of healthcare information.
- **Financial Modernization Act of 1999 (Gramm-Leach-Billey Act):** Defined "safeguard" rule for protection of individuals financial information
- **Patriot Act of 2001:** Has broad implications to individual privacy. (information privacy).

All of the previous laws apply to public organizations to some degree, however, some of them are distinctly focused on specific types of organizations. Thus, healthcare organizations (such as hospitals, pharmacies, clinics, healthcare insurances) are regulated by HIPAA with two principle parts:

- Privacy Rule proving protection of patients' identifiable personal health information
- Security Rule designed to secure electronic transmission of such information

Financial institutions (such as credit unions, educational institutions, publicly held financial organizations) are regulated by Financial Modernization Act of 1999 (also known as the Gramm-Leach-Bliley Act) to protect consumers' personal financial information held by financial institutions with three principal parts:

- Financial Privacy Rule regulating collection and disclosure of customers' personal financial information by financial institutions;
- Safeguards Rule (that applies to institutions that collect information and to organizations that receive customer information; and
- Pretexting provisions designed to protect consumers from individuals and companies that obtain their personal financial information under false pretenses.

Federal government organizations (such as civil and military institutions) are specifically subjects of the Computer Fraud & Abuse Act of 1986 and the subsequent U.S. National Information Infrastructure Protection Act of 1996.

Patriot Act 2001 (short title: Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001) is a wide range security provisions applicable to all spheres of public organizations.

New laws placed a new light on the responsibilities of corporate officers for information security, proper use, and protecting privacy of information. A recent article in CIO Magazine (Scalet, November, 2001) indicates that "...To hear some people tell it, corporate liability for failed information security is the coming apocalypse. Several experts predict a flurry of personal injury lawsuits filed by customers whose personal information has been disclosed, corporate lawsuits based on damage caused by security breaches at business partners and class-action lawsuits filed on behalf of irate stockholders." Defense attorneys are exploring whether corporate officers could be held personally liable for information security breaches (Dodson-Edgars, 2002).

Due to the nature of its information holdings, a public organization could be subjected to more stringent law requirements and exposed to more public scrutiny of its information security than a private corporation. Building fault-tolerant systems (i.e., a system capable to detect and attempt recovery from failure is at the core of information security planning for large organizations).

## POLICIES AND PROCEDURES

It is commonly accepted in the Information Security community that above all other efforts, a well-designed policy and procedures (both based on commonly accepted and a good Information Security administration assures the most successful defense against hackers and disasters.

- A policy, however, is driven by business rules, often targets information technology, and is addressed to people. Policies and procedures are bounded by business rules and new business requirements, which make it more difficult to secure the enterprise's assets
- Policies and procedures also target information technology. But over period of time, new software packages and operating systems are becoming more complex and feature rich. As security issues are addressed, they require keeping up with patches, a daunting task at large enterprises as well as for home users
- Finally, policies and procedures are addressed to people. Building security awareness and emergency readiness among employees is a critical (and often skipped) task of Security Administration. IT teams tend to do more with less; in the absence of adequate management tools, mundane security chores such as managing device ports to control confidentiality of incoming and outgoing data traffic may quickly be considered a low priority

### Information Security Assurance at Public Organizations

The *security* features of public sector *information* systems are quite important as these are regularly part of

critical infrastructures or handle personal or sensitive data. Public sector organizations usually include all local, city, state, and federal governments along with non-profit institutions and agencies.

E-government is a relatively new form of a virtual public organization. Relying on information technologies such as the Internet (possibly in the future intranets and extranets) and wireless networks, it has the capacity to alter relations of citizens and businesses with various units of government. These technologies can provide assistance in: collecting, processing, and analyzing data; improved delivery of public sector services to citizens; enhanced interactions of government units with business and industry; citizen empowerment through access to information; and more efficient government management (Bekkers & Zouridis, 1999; Loukis & Michalopoulos, 1995). The ensuing benefits include fewer corruptions, more transparency, increased convenience, additional revenue, and less cost.

Ordinarily, the interactions between a citizen or business and a public agency take place in a government office. E-governance can help place service centers closer to the clients. Examples of such centers include an unattended service kiosk in a government agency or in another public location closer to the client, or access to the services through the use of a personal computer from home or office.

Government information systems differ in a number of ways from their counterparts in the private sector. The strategic nature of many government agencies means that failures of their information system can lead to large-scale disruptions to many economic and social activities and even endanger human lives. For example, disruptions in emergency service systems could be catastrophic. Thus, the availability of information is a crucial feature of their operation. Also, confidentiality and integrity of data are of the highest concern for public related agencies such as IRS, Medicare, and Social Security services, which deal with personal, confidential, or sensitive data. Breaches of information security, which lead to unauthorized leakage of information or modifications of stored or transient information, and loss of trust in public sector organizations.

It should also be noted that public sector organizations operate in a specific way and in uniquely challenging environment. Frequently, they must function with inflexible institutional procedures limiting their procurement, hiring and rewarding activities. They are usually not subjected to the forces of the market economy, while they are often constrained by political considerations. The above factors contribute towards a set of specific issues regarding public sector information systems security (Loukis & Spinellis, 2001).

The estimates of effort and cost of implementation of information security assurance (or, in short, IA) are typically based on the following:

- Results of analysis using models or historical data for converting characteristics of the work products and tasks into labor hours and cost; such historical data include the cost, effort, and schedule data from previously executed IA projects
- Methodology (models, data, and algorithms) used to determine needed material, skills, labor hours, and cost; it includes identifying the critical computer resources for the IA project and having cost and effort estimates for them

The accuracy of these estimates depends on the availability of relevant models and historical samples for IA data. Multiple models and/or methods may be used to ensure a high level of confidence in the estimate. However, it is also likely, that for a specific public organization building an IA infrastructure may be unprecedented or include the type of tasks that do not fit the available models. In such cases, judgmental estimates provided by a group of experts may suffice. Overall, the IA-building efforts that do not follow an analogous work done somewhere else are riskier; require more preliminary cost-analysis research and more time to develop reasonable models and assumptions for estimate.

## BASIC DEFENSE MECHANISMS

Confidentiality, integrity, and availability (also known as the C.I.A. concept) are at the core of information security concept. Information protection is focused on prevention, detection, and response (or correction) to disclosure, alteration, and denial of service activities. The access control mechanisms are implemented through administrative (polices and procedures), technical (e.g., restricting access) and physical (e.g., infrastructure, badges) means.

Access control is one of the most technically elaborate areas of supervision. The technology employed here varies from passwords (what you know), to tokens (what you have), to biometrics (what you are).

Remote access authentication systems and procedures place additional significant requirements and load on the system infrastructure, often involving additional servers (for password authentication) and procedures. Access rights are managed based on privileges of a user, security sensitivity of information, and the "need-to-know" requirement.

The system configuration is focused on protecting the information resources depending on their security

sensitivity, with the most secure information guarded within "trusted network" (a part of the entire organization's system or network). The most common tools employed here are proxy servers, routers, and firewalls. Proliferation of wireless networks poses an increased risk. Virtual private networks (VPN), which are very popular for wired networks, are also very effective for wireless networks.

Cryptography is a vital mechanism for ensuring data confidentiality and integrity. New standards, encryption algorithms can make data communication via public networks very well protected. However, it needs to be reminded, that there is no absolutely unbreakable encryption algorithm. Protection is always a factor of time.

Computer components and the way they function in collaboration is another area that needs to be securely protected. Administrator needs to understand and define trusted computing base (TCB) that would encompass hardware, software, and firmware. The TCB serves as a benchmark for indications of possible security intrusions.

Development and implementation of applications must follow an acceptable model to reduce risk of security violations. Thus, the Capability Maturity Model® Integration (SEI, 2004) of Carnegie Mellon University is a frequently recommended for well-controlled applications with repeatable functions.

Business continuity and disaster recovery planning ensures that the business can continue in an emergency and will maintain availability of the critical systems. It includes, among others, business impact analysis (BIA), which provides assessment of all business functions measured in terms of accumulated financial loss by period of time. Disaster recovery planning (DRP) is of utmost importance and is discussed below.

## DISASTER RECOVERY PLAN

*An organization should also make sure it has developed a disaster recovery plan, along with the security measures, that incorporate redundancy of systems and offsite backups in case the worst scenario happen.* (Jost & Cobb, 2002)

This planning model is based on values. Crises thrust an organization's values into the realm of public scrutiny. This must be recognized early in the crisis planning process. Here are the nine steps we recommend in crisis planning (Kamer, September 2004).

1. **Step 1. Establishing the Crisis Team:** This has to be done by the CEO. It should have representatives from finance, operations, communications and marketing, human resources, and information technology departments. The crisis team tasks are to manage the process of drafting the crisis plan, establishing a schedule of training and testing, and securing the resources.
2. **Step 2. Articulating Workable Values in Crisis:** One of the objectives of crisis planning is to demonstrate that the organization during crisis can act promptly and show its true colors. This process will helps managers to pay attention to the right set of objectives in a crisis situation—not just giving the impression that the crisis has been dealt with.
   The defining moments of organization forces managers to disclose, examine, and select the ethics of their organization. Defining moments reveals the basic characteristics of an organization. They show what the company really does instead of what it hopes to do (Badaracco, 1997). This is especially true in crisis, as any manager who has been there can attest. Decisions to contact the press, release a warning, or buying an advertisement explaining the organization's position are hardly ever-easy options.
3. **Step 3. Crisis Risk Assessment:** It is impractical to assume that any disaster recovery plan can anticipate all of the potential crises. Organizations involved in crisis planning usually have some understanding of potential crisis situations such as virus attacks, fires, floods, and earthquakes.
   Under what circumstances an ordinary everyday event may become a crisis? What conditions already exist within the organization that may all of a sudden become public embarrassment? Are there crises that have happened to others and may happen to your organization? These are the risks. The assessment should evaluate the damage that these risks may inflict on the organization. Those with the highest cost should be the primary focus of the crisis planning
4. **Step 4. Define Roles:** When facing crisis, managers will accept different or expanded responsibilities. This is especially true in cases involving natural disasters, large-scale industrial mishaps, or crisis involving various agencies. People may find themselves dealing with individuals that they do not regularly make contact with–or, at times, individuals they don't know
   The disaster recovery team must recognize the possibility of new faces, define the main roles, and name who will assume those roles. Much of this approach originates from the incident command system (ICS), a military-like management system first utilized in California in the beginning of 1970s to combine resources to handle wild fires (Auf der Heide, 1989).

5. **Step 5. Develop Interim Responses:** Disaster recovery planning helps to identify problem areas that call for immediate action. On these occasions, the management should not delay the required actions needed to fix the problem until a written plan is prepared.
6. **Step 6. Write the Plan:** A comprehensive disaster recovery plan sometimes may give the organization a false sense of protection. The plan is needed to document the organization's view of crisis management from values through execution. That has to be in writing, because it should last executives and employees' turnover. It functions as the organization's policy manuscript, a training handbook, and a playbook. The most valuable part of the plan will be the lists–telephone numbers, materials records, and media lists.
7. **Step 7. Train on the Plan:** Upon the completion of the crisis plan, attention must be paid to the training of the employee. It's important to discuss with the employees the reasons behind developing the plan. Also, employees should be aware of how to use the plan, what motivated the decision to put it together, and how it is designed to shield organization values, activities, and standing in the community. In many occasions, disaster recovery planning allows organizations to become aware of their deficiencies in the area of media training. In addition, top officials may recognize that the news media preparation they may have had in the past may be insufficient for the handling of crisis communications.
8. **Step 8. Test the Plan:** Crises times bring deep emotion and extreme pressure to the organization. Operations, good will with the public and in many cases lives are at risk. The crisis plan will not be effective if it is not accompanied with trainings, simulations, and drills. Only through testing the participants are able to feel the real deal and the plan's deficiencies can be revealed (Kamer, January 1998).
9. **Step 9. Modify the Plan:** The plan needs to be viewed as a living document. It's imperative that one member of the crisis team be explicitly responsible for refining and updating the plans. It's also good practice that the plan includes an expiration date. This causes the crisis team to modify the plan at least on annual basis. Comments and responses from trainings should be included into the plan.

Additional guidelines, standards, and regulations can be found in the following sources:

1. **National Institute of Standards and Technology (NIST):** NIST offers technical publications along with training assistance to accelerate the development of innovative technologies.
2. **National Computer Security Division:** The mission of National Computer Security Division is to enhance the information systems security by researching, analyzing, and advising agencies of IT vulnerabilities and devising techniques for the cost-effective security and privacy of sensitive federal systems.
3. **Office of Personnel Management (OPM):** OPM provides training requirements and guidance relating to personnel management within the federal government.
4. **Government Accountability Office (GAO):** GAO evaluates federal programs and issues legal opinions on IT deficiencies.
5. **General Services Administration (GSA):** GSA secures technology and provides training services for federal agencies.

## FUTURE TRENDS AND CONCLUSION

Threats of information warfare and threats to public security highlighted by the events of September 11 as well economical threats posed by ever-growing population of hackers and availability of hacking tools will likely result in new industry regulations concerning information security, intrusion detection, crisis planning, and recovery. Forward-thinking companies are already seeking to avoid increased regulation by implementing best practices in the crisis management arena. Understanding of basic threats and defenses including this nine-step methodology provides an important starting point for public organizations to begin information security and disaster recovery planning in this new era of risk.

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## KEY TERMS

**Computer Networks:** It is a system utilized for estabishing communication among among two or more computers.

**Disaster Recovery Plan:** A document that lists all activities required to bring back a system to the conditions that existed before the disaster occurred.

**E-Government:** It refers to the use by public organizations of information technologies that have the capability to alter the relations with citizens, businesses, and other government entities.

**Information Warfare:** It is the offensive and defensive use of information and information systems conducted during times of crisis or conflict to achieve or promote specific objectives over an adversary's information and information systems.

**Security:** In the IT area, security refers to techniques for making sure that data stored in a computer system cannot be accessed or modified by any individual without permission.

**Threat:** An activity that, if realized, can cause damage to a system or create a loss of confidentiality, integrity, or availability of data.

**Virus:** A program that is loaded onto a computer system without owner's knowledge and it is capable of reproducing itself and causing damage to files or other programs on that computer.

**Vulnerability:** A weakness in a system that can be exploited by a threat.

# Legal E-Learning and E-Government

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## INTRODUCTION: THE LACK OF EDUCATIONAL DESIGN

### Fact

Today, most e-government Web sites are limited to providing and disseminating legal or legally relevant information (hereafter legal information; see "Key Terms" section). Generally speaking, the online provision of legal information is not made in line with sound educational principles. Most likely, this could be said about the provision of all kinds of information on e-government Web sites. As I am a lawyer, I only feel entitled to assess legal information. Hence, I would like to limit my reflections in this article to legal information. As a number of examples suggest, e-government Web sites are not conceived as legal e-learning environments (e.g., http://www.ch.ch, http://www.admin.ch, http://www.bund.de, http://bundesregierung.de, http://www.help.gv.at, http://europa.eu.int, http://www.firstgov.gov. All visited January 4, 2005).

### Problems

(Mis)conceiving the state's online presence is detrimental since the lack of educational design fails to ensure that users can assimilate and process the legal information which e-government Web sites provide in an effective and sustainable manner. Within the communicative framework applied here, mere provision means that so-called *e-government addressees* (see "Key Terms" section) are not assisted in their efforts to assimilate and process the legal information they find on e-government Web sites. Their chances of building up legal or legally relevant knowledge (hereafter legal knowledge) are compromised as a result. There is good reason to doubt that the prevalent uneducational design of legal information can arouse the interest of the envisaged target audience(s), let alone evoke positive emotions. Furthermore, it is to be doubted whether current design can do proper justice to the cognitive and emotional needs which e-government addressees undoubtedly have. Moreover, the lack of appropriate educational design would appear to call into question the mid- to long-term success of managing legal information on e-government Web sites in an uneducational fashion.

### Questions

These problems raise several questions: How can e-government addressees assimilate and process legal information in a sustainable manner? How can e-government Web sites be designed such that their addressees can build up their legal knowledge more effectively? How should legal information on e-government Web sites be designed to arouse (and sustain) their target audience's interest, offer it pleasure, and meet its cognitive and emotional needs? How should legal information management on such Web sites be practiced to assure mid- to long-term success? How might the e-government actors responsible for creating such sites reconceive what is now mere legal information dissemination as legal information communication? Would legal information on e-government Web sites need to be scripted in line with educational principles? Should such sites be designed as legal e-learning environments? Given the broad range of electronic learning environments, how would legal e-learning scenarios need to be designed in the context of e-government Web sites? Which specific requirements of what I have called *legal (information) design* (Brunschwig, 2001; see "Key Terms" section) would apply to legal e-learning environments on e-government Web sites?

### Relevance of Questions

Resolving the previous problems would have a number of significant benefits: E-government addressees would be able to assimilate and process legal information in a sustainable manner. They would be able to build up their legal knowledge with fewer constraints. They would absorb legal information with greater interest, pleasure, and gratification, thereby inducing a learning curve. Their cognitive and emotional needs would be met more adequately. Moreover, the image of those responsible for managing online legal information would improve in the mid- to long term because they could no longer be (dis)qualified as merely disseminating legal information but would be acknowledged for their efforts to communicate it. In creating e-government Web sites along stringent educational principles, these sites would be conceived as legal e-learning environments much more effectively, aligning them with the specific context of e-government Web sites and their addressees' needs.

## Hypothesis

Designing e-government Web sites as legal e-learning environments would benefit all those concerned in the ways sketched previously above.

## Current State of Research

There is very little published research on whether e-government Web sites can be designed as (legal) e-learning environments and, if so, how (e.g., Bose, 2004; Vatter, 2004). Bose (2004) aims at identifying the technologies available for establishing online education and training. Vatter (2004) notes that it is a matter of enabling both "learning *for* e-government applications" and "learning *with* e-government applications" in terms of "a complementary educational conception of the application" (p. 10). Whereas the majority of publications I have seen focuses on e-government and knowledge management (e.g., Liebowitz, 2004; Wimmer, 2003, 2004), this article seeks to contribute to the scant research on designing legal information on e-government Web sites in line with stringent educational principles.

## Procedure

In developing at least rudimentary answers to the previous questions, I will first venture briefly into legal history to discuss the reflections on education of a prominent representative of the French Enlightenment who made a persuasive case for the state as a teacher, particularly as its citizens' legal instructor. I will then outline key aspects of e-learning and key aspects of legal e-learning in the context of e-government Web sites. I will close with findings, future trends, and a conclusion.

# BACKGROUND

## A Brief Excursion into Legal History

That the state should act as a teacher, particularly as a legal instructor, is not a new postulate. The eighteenth century witnessed a heated and controversial debate on the relationship of the state and education. Marie-Jean-Antoine-Nicolas de Condorcet (1746-1825), an authoritative representative of the Enlightenment movement in France, advocated state education in a number of his writings, most strongly in *Sur l'instruction publique* (1791/1792) and *Rapport et projet de décret sur l'organisation générale de l'instruction publique* (1792). As Condorcet's reflections contribute to substantiating and validating my key postulate that e-government Web sites should be designed as legal e-learning environments from a historical vantage point, I will outline the gist of his reflections regarding the learning contents and objectives (to use the terms of modern educational studies) the state should focus on, how he accounted for these contents and objectives, and which groups of learners he envisaged.

Condorcet maintained that public instruction (*l'instruction publique*) should cover all knowledge areas, including the law (Condorcet, 1791/1792, p. 154.; Hager, 1993, p. 78). The purpose of state instruction is to develop all the learner's talents and skills, to impart legal knowledge (chiefly as regards the individual citizen's rights and obligations towards the state), and to equip learners (citizens) with the knowledge they require in their professional lives in order to best serve the commonwealth. On the one hand, instruction aims at benefiting the learners' interest to attain happiness and satisfaction; on the other, it urges learners to act in the interests of the general public (Hager, 1993, p. 78). Condorcet's core argument for public instruction is that in a just state the equality and freedom of citizens cannot exist without the provision of a universal basic education ensuring that citizens are edified as regards their rights and obligations (Hager, 1993, p. 80; Lüchinger, 2002, p. 312). Providing *all* citizens, indeed *all* human individuals, with the opportunity to learn was paramount in Condorcet's thinking. He appealed not only for the instruction and education of children and adolescents, but also for the state to make provision for adult education (Hager, 1993, p. 79; Lüchinger, 2002, p. 31). Lifelong learning was more than justified, he argued, because knowledge once acquired was subject to date since science and (professional) practice never ceased to produce new insights. Many people, Condorcet argued further, had been deprived of an education in their childhood or youth, which validated lifelong education even more (Lüchinger, 2002, p. 315).

# E-LEARNING IN GENERAL

## E-Learning Defined

The relevant literature defines *e-learning* in various ways (see Back, Bendel, & Stoller-Schai, 2001, p. 28; Colvin Clark & Mayer, 2003, p. 13; Dichanz & Ernst, 2002, p. 43; Rosenberg, 2001, p. 28). It is beyond the scope of this article to discuss what are partly controversial notions of e-learning. The semantics of this compound can be construed "from the meaning of its parts and the manner in which the complex expression is formed from these" (Linke, Nussbaumer, & Portmann, 2004, p. 157). Accordingly, we can interpret the *e* (for *electronic*) and *learning*, and how they are related. Proceeding in this way helps

develop a working definition which substantiates my postulate—that e-government Web sites should be designed as legal e-learning environments. On the one hand, this working definition will bring into focus the technology (i.e., digital media) which learning requires; on the other hand, it will cast light on learning as a process. Inasmuch as it is feasible, this working definition will take into account a host of relevant—and related—aspects (such as learning contents, learning objectives, learning methodology, the rationale for learning for what is learnt, the temporal, spatial, and social contexts in which learning occurs, and instructor and learner profiles). Most definitions of e-learning consider these aspects, either separately or in conjunction with one another. As for *learning*, I will frame this key term in terms of learning psychology and cognitive psychology; as for *electronic*, I will draw on approaches in information management and educational studies.

The term *electronic* refers to the features of learning, that is, where and how "learning" occurs (in an electronic-digital environment). In the relevant literature, "electronic" has a broad range of meanings. It is common to use the term when there is mention of the digital media used in so-called *New Learning*. These media are information- and communication technologies (intranet and internet) and comprise learning programs which are available on various storage media, such as disks (still), CD-ROMS, and DVDs. As several authors have noted, these media also include PCs, digital TVs, mobile phones, and other digital apparatuses (Back et al., 2001, p. 28; Colvin Clark et al., 2003, p. 11 and 13; Dichanz et al., 2002, p. 46 and 48; Rosenberg, 2001, p. 28).

Before considering two particular approaches to learning (direct instruction and constructivism), I would like to look at general notions of learning. The psychology of learning views learning as a process (Edelmann, 2000, p. 278). Together with our memory, it is part of the human information processing apparatus (Edelmann, 2000, p. 276). As Edelmann (2000) states, "learning is dispositional" (p. 278). He describes it as analogous to acquiring or modifying particular psychological dispositions (i.e., attitudes), that is, the willingness to adopt a certain behavior or take specific action (Edelmann, 2000, p. 278). Cognitive psychology also views learning as a process which takes place 'inside' learners, involving them in acquiring knowledge, skills, and attitudes (Leutner, 2002, p. 116). Whereas "skills" refer to the ability to apply the knowledge acquired, "attitudes" denote the positive or negative "orientation towards objects or issues" (Leutner, 2002, p. 117). Expanding the cognitive-psychological view to encompass that of behavioral psychology means that "the situation in which the learning process is set plays a central role" (Mandl, Gruber, & Renkl, 2002, p. 140). In these terms, learning is "a process in which factors within a person interact with situative components external to the individual. Although there is no single or unified definition of *situation*, there is a consensus that the term refers not to material aspects alone, but equally to the learner's social environment and hence to other individuals" (Mandl et al., 2002, p. 140).

Direct instruction assumes that learning proceeds passively, that is, chiefly in a receptive and instructor-dependent manner (Edelmann, 2000, p. 287). In line with this approach, learners acquire factual and fact-based knowledge (declarative knowledge, i.e., "knowing that"), whereas procedural knowledge (i.e., "knowing how") takes second priority (Dörr & Strittmatter, 2002, p. 39; Edelmann, 2000, p. 287). Direct instruction is instructor-dominant (Edelmann, 2000, p. 287), that is, the instructor assumes the role of a moderator (Dörr & Strittmatter, 2002, p. 39).

If learning is conceived in constructivist terms, by contrast, learning is an active process (Dörr & Strittmatter, 2002, p. 32; Edelmann, 2000, p. 287; Mandl et al., 2002, p. 140) where application—respectively transfer-oriented declarative and procedural knowledge is built up (Dörr & Strittmatter, 2002, p. 32; Edelmann, 2000, p. 287; Mandl et al., 2002, p. 140). In this view, learners are more or less self-directed (Edelmann, 2000, p. 287). Further, learning is problem-based and authentic in that the tasks (or problems) which learners are meant to solve resemble those they will have to deal with at some point in their real world experience (Edelmann, 2000, p. 287). Learning is cooperative, moreover, in that it involves working with others in teams (Dörr & Strittmatter, 2002, p. 32; Edelmann, 2000, p. 287). Learners are therefore largely instructor-independent and occupy a central position (Edelmann, 2000, p. 287), whereas the teacher or instructor acts as their guide or adviser (Dörr & Strittmatter, 2002, p. 39). The constructivist approach is virtually completely aligned with current learning reform concepts. The only additional aspect is that learning is considered a *lifelong* process (Edelmann, 2000, p. 288). As we will see, the constructivist and direct-instruction notions of learning complement one other excellently in e-learning.

On the basis of the previous, I would like to use the working definition of *e-learning* provided at the end of this article (see "Key Terms" section).

## Features of E-Learning Environments (E-Learning Platforms)

(1) How can e-learning environments be described? (2) What does or should designing e-learning environments along educational lines look like? Which elements do or should e-learning environments comprise? (3) How do these requisite elements relate to the approaches dis-

cussed above? In dealing with these questions, and with a view to legal e-learning on e-government Web sites, I will focus on intra-and internet-based learning environments (i.e., online learning).

Dörr and Strittmatter (2002) argue that "learning comprises various factors of 'internal' and 'external' learning circumstances. The notion of the learning environment aims in the first instance at external conditions, particularly learning materials, tasks, and their design…" (p. 30). Müller and Dürr (2002) advance another general description: "Learning platforms comprise a bundling of Web and data processing technologies. Together they provide instructors, learners, tutors, administrators, and authors (where appropriate) with an infrastructure which ensures a uniform working environment. As such, they provide a framework for the distribution of WBTs (Web-based Trainings) and enable learning success monitoring and comprehensive communication among all participants" (p. 166).

E-learning platforms should include the following key educational features (the list is not exhaustive): learning materials, tasks, communication features, cooperation possibilities, tutor features, and learner-tracking. E-learning platforms differ from non-e-learning platforms in that the contents of the latter include no educational features, nor do these platforms aim at educational purposes. To be more specific, non-e-learning platforms do not feature learning materials and learning tasks. They offer no communication features and cooperation possibilities which serve learning and teaching purposes exclusively. They do not possess tutor possibilities and they lack learner tracking.

*Learning materials* refer to those media (i.e., technologies or formats) in which information is provided, such as downloadable Adobe PDF templates (Döring, 2002, p. 249), hypertexts and hypermedia (linked GIF or JPEG files), audio and video streaming that can be used with standard programs (Windows Media Player or RealPlayer). These media are frequently updated and can be accessed by learners. As regards the coding of learning materials, static images (photographs, graphics) or animated images (videos and animations) can be found as well as written or spoken texts or mindmaps (through their combination of text and image, mindmaps are very useful multicodal entities). Learning materials are structured in three ways: either in line with the needs of learners or with the methodological-systematic requirements of a given subject or discipline, or both.

*Tasks* are indispensable on e-learning platforms. The relevant literature sets out demanding specifications for e-learning tasks: First and foremost, they should enable learners to be self-directed (Dörr & Strittmatter, 2002, p. 31; Müller & Dürr, 2002, p. 170). Mandl et al. (2002) state that tasks should be complex and consist of very different component problems (p. 143). They argue furthermore that "the learning environment should provide the learner with multiple contexts to ensure that knowledge is not restricted to a single context, but can be transferred onto other problems. Further, learners should be given the opportunity to view problems from multiple perspectives, thereby instructing them to view and engage with contents under different aspects and from changing vantage points. This is intended to promote the flexible application of knowledge" (p. 143). Dörr and Strittmatter (2002) argue strongly for authentic tasks, that is, ones which are based on (life and practical) experience and are linked with (the learners') professional or private lives (p. 31). The demand for authenticity means that tasks must be situated, that is, associated closely with the professional or private situations, or both, which (adult) learners encounter (Dörr & Strittmatter, 2002, p. 31; Mandl et al., 2002, p. 146). Finally, tasks should be self-reflexive in that they make reference to the meta-level of learning, thereby inviting learners to reflect on their learning. As Mandl et al. (2002) note, tasks should grant learnes time and space to consider what it is they are doing when they are acquiring specific knowledge and skills during a task (p. 145). Particular attention should be paid to describing and analyzing the processes in which learners are involved in resolving a task (Mandl et al., 2002, p. 145; Müller & Dürr, 2002, p. 169). Further requirements include bringing the knowledge store into clear view, assessing its quality, and disclosing the subject-specific language used (Mandl et al., 2002, p. 145).

These reflections lead straight to the third necessary element of e-learning environments: *communication features*. Müller and Dürr (2002) state that "one of the decisive advantages of online learning over offline variants (e.g., CD-ROM-based learning programs) is that by being connected to an online network, such as a company-intranet or the internet, learners have access to a number of communication options […] Learning platforms provide […] different asynchronic and synchronic communication tools. The most widespread synchronic technologies are chats, whiteboard (see "Key Terms" section), video- and audio conferencing, and application sharing (see "Key Terms" section). The most widespread asynchronic communication technology is e-mail. Other widespread asynchronic tools are Web-based discussion fora and 'newsgroups'" (p. 167). These communication features allow learners to engage with each other, enabling them to tackle tasks in pairs or groups (p. 169).

The above leads to another prerequisite for successful e-learning environments: *cooperation possibilities*. E-learning platforms should permit social learning, that is, paired or small-group learning (Döring, 2002, p. 249; Dörr & Strittmatter, 2002, p. 31; Mandl et al., 2002, p. 144). Müller and Dürr (2002) emphasize the importance of "group discussions that take place with the help of asynchronic

technologies—particularly discussion fora—in working groups and teams. These can enrich the learning process significantly, for instance when other net-based learning modules fall back on these fora, or when experts acting as moderators promote learners in various different ways. In this setting, synchronic technologies permit rapid communication within chats, and so forth; moreover, they are able to promote team-learning highly effectively through Web-based video and audio conferencing or […] application sharing or whiteboard technology"(p. 171) Cooperative learning contributes both to exchanging knowledge and experience, and to promoting the acquisition of interpersonal decision-making skills (Müller & Dürr, 2002, p. 172).

*Tutoring features* are another prerequisite for e-learning environments: E-learners need experts to guide and support them (Mandl et al., 2002, p. 144). Müller and Dürr (2002) note that "many learning platforms offer mechanisms enabling tutors to intervene in an individual or group learning process. These tools are seldom used to run an instructor-centered session; the instructor rather assumes the role of a coach" (p. 171). Inasmuch as learners misunderstand or misconstrue learning contents or have not digested these properly, experts can step in, make adjustments, make suggestions for improvement, or both (Müller & Dürr, 2002, p. 171). As for methodology, tutoring features allow experts to outline and explain a procedure in detail, that is, to reveal the underlying methodological rationale of a task (Mandl et al., 2002, p. 147). Should learners lack motivation or should their motivation decrease, tutors can respond appropriately and turn this negative development around (Müller & Dürr, 2002, p. 171). In order to connect with learners, tutors should be able to use asynchronic technologies (e.g., e-mail and discussion fora) and synchronic ones (e.g., chat, audio- and video conferencing, whiteboards, application sharing) (p. 171). On balance, tutoring features have significant motivational value (p. 171).

Learning environments would be incomplete if they lacked *learner tracking*: This feature provides learners with personalized feedback regarding their progress (Dörr & Strittmatter, 2002, p. 31; Müller & Dürr, 2002, p. 165). Döring (2002) notes that this can occur in the shape of "self-tests, efficiency checks, scoring, and grading" (p. 249). Whereas such monitoring is aimed at identifying the individual learner's strengths and weaknesses, it also serves to reveal the opportunities and limitations of any given learning program (Müller & Dürr, 2002, p. 170). Specifically, learners should be informed whether they have made mistakes and, if so, which (p. 170). The positive effects of such learner tracking are that learners are provided with the opportunity to assess themselves in a factual and clear-headed manner. Tracking, moreover, should potentially result in program quality enhancement (p. 170). Learner tracking requires "data-base-supported user administration that records actions and results so that learning levels can be assessed on a continuous basis" (p. 165). User, that is, learner administration must safeguard the individual's private sphere and ensure data protection and data security (Burscheidt, 2002, p. 196; Müller & Dürr, 2002, p. 165).

How are the above educational elements of e-learning platforms related to the direct instruction and constructivist approaches to learning? Inasmuch as they have been scripted along educational lines, learning materials correspond to the direct instruction approach because they solely permit receptive and instructor-dependent learning. As a rule, learners do not have the possibility to deal actively with learning materials because these are designed only and exclusively by instructors. Learners must therefore absorb learning materials passively. These materials do not offer cooperation possibilities. In this respect, learners depend on those designing the materials provided. Whereas certain features of e-learning environments can be attributed to constructivist approaches, learning materials, which are basically instructor-dependent, are an exception. Examples of instructor-dependent learning materials include downloadable Adobe PDF templates, instructor presentations in audio and video streaming formats, and hypertexts and hypermedia. Hypertexts and hypermedia are associated with the constructivist approach in that they comprise hyperlinks which provide learners with scope to navigate a program in line with their personal learning needs, ensuring self-directed learning. Tasks can be attributed to the constructivist approach in that they provide an impetus for problem-based learning, just like communication features, by allowing for and encouraging cooperative learning. The same applies to cooperation opportunities and tutoring features: cooperative learning would be inconceivable without commensurate cooperation opportunities and tutoring features are imperative to confer the role of adviser on the instructor.

## Reasons for E-Learning

There are several reasons in favor of e-learning. In line with the fundamental educational triangle, they pertain to learners, instructors, and learning contents alike.

Because knowledge is subject to ongoing change and expansion, we are called upon to update ours as best as possible and to become lifelong learners (Lang, 2002, p. 25). "People can access e-learning anywhere and any time. It's the 'just in time—any time' approach that makes an organization's learning operations truly global" (Rosenberg, 2001, p. 30). Depending on their knowledge and their "situation-contingent and interest-directed" (Lang, 2002, p. 32) needs for information, learners can self-direct their learning. They take their own route through

the hypertextual and hypermedial learning material provided by deciding which and how much information they wish to search for, assimilate, and process. Learners also determine their learning speed themselves (Lang, 2002, p. 32). They can choose between different social (i.e., interpersonal) formats by opting for synchronic, asynchronic relations, or both with other learners, tutors, or both, deciding whether they wish to communicate about contents, their relationship, or both. Learners construct knowledge on the basis of exchange and dialog (Colvin Clark & Mayer, 2002, p. 22; Lang, 2002, p. 33). Such learning partnerships, learning teams, or both, can be long-lasting and reach beyond the duration of an e-learning program, as Rosenberg notes (2001, p. 31). E-learning implies that learning contents are mostly multicoded, that is, presented simultaneously in the shape of texts, images, and sounds. Multicoded learning contents have positive effects on learners because they involve thought *and* feeling (Lang, 2002, p. 31 and 34); similar to problem-based learning, multicoded learning contents deliver high and rapid results (Colvin Clark & Mayer, 2002, p. 22).

Another reason in favor of e-learning is that it provides instructors with opportunities to assume their educational role beyond the usual constraints of time and place (Lang, 2002, p. 36). E-learning modifies the instructor's role positively, enabling him or her to advise and coach individual learners (and to moderate online discussions among several learners), rather than merely delivering or presenting material (and at times overengaging in self-presentation) (p. 39).

E-learning benefits learning contents, too, by structuring these either hypertexually or hypermedially (Lang, 2002, p. 32). Multicoding is less cost-intensive than print media; it also has greater potential than traditional (e.g., paper-bound) media. Hypertext and hypermedia allow for the coding of learning contents as animated images (animations, video) and sounds; these features are particularly well-suited to simulating realistic cases (Colvin Clark & Mayer, 2002, p. 21). Lang (2002) points out that multicoded information "has higher information density compared with single (i.e., monocoded) media, complex impression quality, and therefore added information value. Complex statements can be presented in a more authentic and closer-to-life manner, on different levels of abstraction, and from different perspectives" (p. 34). Compared with traditional teaching settings and their spatial and personal limitations, online learning contents are able to connect with any scalable number of learners (Rosenberg, 2001, p. 31). While contents are the same for all learners, they can be customized to suit individual needs (p. 30). And as Colvin Clark and Mayer (2002) note, "what is special about the computer's role in learning is that the learner's actions taken in the simulation are evaluated by a program that responds with hints or feedback supporting immediate correction of errors" (p. 22). On balance, learning contents are thus characterized by feedback features; they can be updated at any time (Rosenberg, 2001, p. 30); they are platform-independent (Rosenberg, 2001, p. 31); and they are quickly accessible regardless of time and location (Lang, 2002, p. 36).

In view of all these reasons in support of e-learning, I would like to point out that e-learning, however, is only beneficial if its quality exceeds e-learning of average or even insufficient quality, or that of poor traditional learning for that matter. Monitoring quality is therefore essential.

## LEGAL E-LEARNING

### Features of Legal E-Learning Environments (Legal E-Learning Platforms) on E-Government Web Sites

Our lives are full of events which are highly relevant to e-government. I would like to illustrate this claim with a case study. It features a Swiss citizen (i.e., a potential e-government addressee) who wishes to resolve a specific legal problem. The case focuses on inheritance and property law and serves to illustrate the previous more general reflections on e-learning environments and e-government Web sites. As I did my legal training in Switzerland, the case views the issues from the perspective of Swiss law, particularly as regards the legal questions involved and how they might be answered. While an international readership might feel that this approach compromises the broad perspective adopted so far unnecessarily, I would argue that the legal issues arising from the event of death constitute a universal *life event* (see further http://www.ch.ch/urn:ch:de:ch:ch.01.02.15:01 and http://www.help.gv.at/Content.Node/79/Seite.790000.html. Both visited February 2, 2005). But as different (national) legal systems regulate the legal consequences of death differently, focusing on a *single* case would appear to be inevitable.

The facts of the case are: A woman (hereafter client) and her siblings have been joint heirs for four years. The undivided estate consists of a detached house (and furniture). The client's youngest sister has been living in the house since their mother's death. The sister has left her own furniture in her apartment (which she now sublets to a student). Now, after four years, the client would finally like to settle the partition of the estate with her siblings. She raises the following issues (and questions): (1) She would prefer her brother's wife, with whom she has a strained relationship, not to be present at the partition negotiations. What are her rights here? (2) She is seeking

a settlement which would enable her siblings and her to apportion the furniture prior to negotiating how to apportion the real estate. Would this be feasible in legal terms? (3) She is looking for a settlement which will entitle her sister to indefinite right of residence in the property, with her own furniture and at no extra cost. What might such a settlement look like?

## Learning Materials

In the context of legal e-learning, the client in the previous case (and other e-government addressees in the same or a similar situation) should be provided with appropriate learning materials. These should comprise details on partition, communities before partition, mode of partition, completion and effect of partition (Swiss Code of Civil Law, Art. 602 ff.), right of residence (Art. 776 ff.), and usufruct (Art. 745 ff.). Possible formats include downloadable Adobe PDF templates, hypertexts, and hypermedia, or audio- and video streaming. The relevant legal norms and other pertinent details on inheritance and property law (such as orthodox and precedent-case interpretations of these norms) should be presented both as spoken and written texts *and* as inanimate or animated pictures, or as mind maps (on visualizing legal norms, see Brunschwig, 2001). Learning materials should be structured such that they meet the e-government client's legal information requirements.

## Task

The case provides an exemplary learning task since it meets several key requirements of such tasks. It consists of several inheritance and property law issues (besides other legal issues which I will leave aside here) and therefore lends itself to multiple approaches, thereby promoting problem-solving skills. And it meets two other essential requirements: it is authentic (i.e., based on the client's life experience and closely connected with her everyday life) and it is situated (i.e., associated with the client's personal circumstances). The task could therefore be integrated effectively in a legal e-learning environment, although it would need to be designed along educational lines to ensure self-directed learning (i.e., allowing for individual learning speed and enabling the present client and other learners to take decisions about which and how much information they wish to search for, assimilate, and process). Should learning tasks on e-government Web sites designed along educational lines be self-reflexive? There would be no harm if e-government addressees developed an awareness of the thought processes which resolving legal problems bring into play. Acquiring certain legal terminology would be merely one benefit. In our case, this would include several notions, such as community of heirs, objective partial partition (only one part of the estate is apportioned, such as household effects, whereas the property and house remain in the deceased's estate), right of residence, and usufruct.

## Communication Features

Asynchronic or synchronic communication tools would serve our client well as they would enable her to communicate with others sharing her predicament. These tools would allow her to tackle the legal problems she faces in an online self-help group, for instance. To this end, the state should consider establishing virtual cafés for e-government addressees to host chats and video and audio conferencing. Such relaxed settings would provide those seeking to resolve legal problems with discussion partners sympathetic to their case; suggested lines of approach (and answers) could be sketched on whiteboards to everyone's benefit. Obviously, e-mail, discussion fora, and news groups would be just as feasible to preclude the individual e-government addressee's isolation.

## Cooperation Possibilities

If the client in our case tackled her legal problems together with others online, this would qualify as social learning. If e-government actors with legal training (in inheritance and property law in our present case) were to moderate the group's syn- and asynchronic discussions, thereby enriching its (legal) knowledge and experience, this would not detract from their expert knowledge and it would certainly benefit the group's decision-making skills.

## Tutoring Features

Our client (and others similarly affected) would require the guidance and support of e-government actors trained in inheritance and property law. As tutors, these experts would monitor—and intervene in—our client's approach to her legal problems, particularly should misunderstandings arise, respectively if the knowledge required to solve the case is not absorbed effectively enough. Tutors should provide information on methodology (i.e., meta-information) if requested. In our case, this might involve outlining or even presenting a model answer. Tutors would coach and guide learners should their motivation decrease. Tutors would have standard asynchronic and synchronic technologies at their disposal to connect with our client and her fellow learners. The state could charge fees for such tutorial services (or what New

Public Management refers to as *products*). Whereas these fees would need to cover the costs such a service would incur, they should not exceed the individual's financial resources and should certainly undercut the exorbitant fees charged by lawyers. On balance, fees should be as low as possible.

### Learner Tracking

Subject to the agreement of e-government clients, e-government Web sites designed in line with educational principles should feature learner tracking. Our client (and her online associates) should be given individual feedback. It is imperative, however, that tracking safeguards the individual's private sphere and complies with existing data protection acts.

## Rationale and Objectives of Legal E-Learning on E-Government Web Sites

Regarding e-government addressess, we can cite the following reasons for implementing legal e-learning on e-government Web sites: It is a fact that many people are at least partially unable to safeguard their rights or assume their obligations satisfactorily under difficult circumstances—simply because they lack adequate legal knowledge. Unable to liaise with others—because they are often unaware that others share their experience and predicament—many are left alone with their legal problems. Whereas the previous tutorial service would still be affordable, seeking legal counsel in the form of a lawyer (or law firm) would most probably overstretch many people's financial resources. Not that lawyers would lose their share of the legal (counselling) services market. Equipped with greater legal knowledge and therefore with a more profound awareness, e-government addressees would seek professional advice sooner and in better time; although they are still laypersons, they would be able to express their situation, case, and concern in clearer and more precise terms. Besides, those empowered in this way would consider taking out legal protection insurance a matter of course (and would be more likely to make appropriate financial provision for such cases). Taking out legal protection insurance would be as self-evident as a health insurance policy (at least in Switzerland).

Given increasing media literacy, particularly among young people, Poledna (2004), for instance, expects the state to tap the potential of new information and communication technologies (ICT) more effectively (p. 85). It could do so by implementing characteristic features of legal e-learning environments on government Web sites, for instance. Legal e-learning on such sites would aim at enhancing e-government addressees' legal knowledge of their rights and obligations, thereby ensuring that they could manage these more effectively. This would transform e-government Web sites into empowerment zones. Another objective would be to enhance solidarity among e-government addressees, particularly among those who share legal problems on account of their personal circumstances. Last but not least, government-supported (and -funded) legal e-learning would serve to meet increasing expectations as regards the state's provision of legal information, specifically by tapping the potential of ICTs.

As for e-government actors (such as prospective tutors), there are many good reasons that substantiate legal e-learning: Client relationship management is a crucial aspect of e-government. E-government actors, however, often lack the specific teaching skills and methods required to impart legal information more effectively. Their chances of establishing, respectively sustaining their relations with e-government addressees successfully are often impeded as a result. Government actors will therefore presumably welcome the opportunity to work with the above features of legal e-learning environments in order to do better justice to the cognitive and emotional needs of e-government addressees to process legal information to the full. It might irritate prospective tutors that they cannot exploit ICTs fully in their exchanges with clients. Which purposes might e-government actors acting as tutors pursue? They could, for instance, aspire to raising their e-government clients' legal information status to match their own, thereby empowering their clients to play a more active and more proficient role in (legal) life. This would enable e-government addressees to make better-informed decisions in ballots and elections, for instance, and it would provide them with a clearer understanding of official procedures and decisions, helping them trust and accept these on the basis of more qualified legal information (Poledna, 2004, p. 88).

The widespread and lamentable lack of an educational design of legal information on e-government Web sites substantiates the case for legal e-learning. The purpose of legal e-learning on government Web sites would be to support and encourage e-government addressees to build up and apply their legal knowledge as required, chiefly by empowering them to resolve and deal more effectively with the legal problems which their lives confront them with.

## FINDINGS

We can now answer the questions raised at the outset: (1) (Re)designing e-government Web sites as legal e-learning environments would enable e-government addressees to assimilate and process legal information in a sustainable manner. (2) E-government Web sites should be (re)designed as legal e-learning environments to arouse

the target audience's interest, give it pleasure, and meet its cognitive and emotional needs. (3) Designing legal information and its management in line with stringent educational principles would prove successful in the mid to long term. (4) E-government actors could transform what is currently mere legal information distribution into communicating legal information by integrating it into legal e-learning environments (i.e., designing it in line with appropriate educational principles). (5) E-government Web sites should be (re)designed as legal e-learning environments. (6) Legal e-learning environments on e-government Web sites should comprise learning materials, tasks, communication features, cooperation possibilities, tutor features, and learner tracking.

These findings are beneficial in that they have established a sustainable foundation for (re)designing legal information on e-government Web sites in line with stringent educational principles, respectively applying these principles to creating future e-government Web sites along the lines of state of the art teaching and learning. These findings, moreover, verify the initial hypothesis and will hopefully encourage forward-looking steps to be taken in (re)designing e-government Web sites.

## FUTURE TRENDS

As e-learning environments become more common in e-government, e-government Web sites providing legal information will be designed along increasingly stringent educational lines. Educational studies, learning and cognitive psychology, counselling studies, visual communication, legal iconography, and what I have referred to as *legal (information) design* elsewhere (see "Key Terms" section) will fertilize e-government and therefore assume increasing significance in its development. For now, I would like to take consolation from Condorcet: "Je me consolerai sans peine d'avoir passé toute ma vie pour un rêveur, si je puis espérer qu'un siècle après moi, l'execution d'une de mes idées puisse faire un peu de bien. (It would be a consolation to have spent my entire life as a dreamer if I could live in the hope that a century after I have passed away the execution of one of my ideas would cause some good.)" (as cited in Lüchinger, 2002, p. 6).

## CONCLUSION

### Discussion of the Overall Coverage of the Topic

One of the guiding assumptions of this article is that e-government addressees are willing and adaptive, that is, they are individuals capable of acquiring the media literacy, interpersonal skills, learning and working strategies required for successful (and gratifying) legal e-learning. Such a positive concept constitutes both a strength and a weakness. A weakness in that this article looks past the actual learning abilities and willingness to learn of e-government addressees: Some are neither eager nor willing to learn, for whatever reasons. Conversely, however, more and more people are recognizing the advantages of ICT (and, by implication, of e-learning). They either have the skills and strategies which (legal) e-learning requires or they would be willing to acquire them, particularly if it is a matter of safeguarding their legal rights. Not all e-government addressees, however, have up-to-date hard- and software (Döring, 2002, p. 250). This article fails to take into account those who lack the technical prerequisites for (legal) e-learning. The fact that hard- and software have become more affordable balances this oversight somewhat. It is to be hoped that costs will decrease further. The state, moreover, should consider providing e-government addressees with the necessary technical infrastructure (including a citizen's card) free of charge, such as in public buildings or in public places.

This article calls upon e-government actors to modify their perceived role in that they would be prepared to act as tutors and coaches on legal e-learning Web sites (and to invest time and effort in acquiring the new necessary e-tutoring skills through vocational training). It could well be that this appeal falls on deaf ears—which might be another weakness of this article. However, I am convinced that there are innovative and eager spirits among e-government actors who would welcome the expanded role that legal e-learning environments offer. I have not provided any critical assessment of the time which (re)designing legal information on e-government Web sites along educational lines would require (Döring, 2002, p. 252). Instead, I have focused on what are more pressing questions. Because e-learning environments are cost-intensive (Döring, 2002, p. 250 and 252), I suppose this article could be criticized for ignoring the deplorable reality of debt-burdenend state budgets. This is indeed a considerable reservation. Nonetheless, I would maintain that the state has adequate tax revenue at its disposal and that ultimately it is for parliament and the electorate (in Switzerland at least) to decide how resources are allocated. Funding legal e-learning on e-government Web sites from the state budget is therefore not entirely inconceivable.

Given the much-lamented flood of legal information, tackling it by means of implementing legal e-learning environments on e-government Web sites seems completely utopian. I would therefore recommend integrating chiefly that particular legal information which is indis-

pensable to e-government addressees to solve, respectively deal more effectively with those legal problems resulting from common *life events*. The fact that the learning and application situation (i.e., the situation in which what has been learned to resolve a legal problem is applied) converge in e-government-specific legal e-learning, which seldom occurs in most learning contexts, is arguably one of the key strengths of this article (on the need to close the gap between learning and application situations, see Mandl et al., 2002, p. 148).

## Concluding Remarks

Notwithstanding the weaknesses of this article, I would maintain that e-government Web sites providing legal information can, and should, be (re)designed as legal e-learning environments. Should this article encourage politicians, e-government addressees, and e-government actors to seriously consider whether and, if so, how the state could assume its role as its citizens' online tutor, it will have reached its key objective, which has been sitting between the lines so far.

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## KEY TERMS

**Application Sharing:** "Application Sharing enables two or more users to make synchronic use of any application" (http://www.computerlexikon.com. Visited January 28, 2005). "Through application sharing users can create, view, and edit files by accessing a software application simultaneously at different locations" (Back et al., 2001, p. 285).

**E-Government Addressees:** The term refers to a country's citizens, foreign nationals with permanent or temporary residence, and enterprises based there. It implies that legal information on e-government Web sites is centered on persons. The term is inspired by Text Linguistics where the term *addressee* refers to the person a text focuses on. *E-government addressees* are therefore those brought into focus by e-government Web sites. Given the communicative approach adopted in this article, the term *e-government addressees* is used rather than the less specific *public*.

**E-Learning:** E-learning is an active process where learners build up application-, respectively transfer-oriented declarative and procedural knowledge. In doing so, learners are more or less self-directed. In a lifelong process, they engage in cooperative learning, based on authentic problems. Their learning occurs in various media, such as information and communication technologies (intranet and internet), in learning programs which are available on various storage media (such as disks, CD-ROMs, and DVDs), or both, and employs digital apparatuses (PCs, digital TVs, mobile phones, and other digital apparatuses).

**Legal E-Learning:** Analogously to e-learning, legal e-learning is an active process where learners build up application-, respectively transfer-oriented declarative and procedural knowledge of legal information (see below). In doing so, legal learners are more or less self-directed. In a lifelong process, they engage in cooperative learning, based on authentic legal problems. Their legal learning occurs in various media, such as information and communication technologies (intranet and internet), in legal learning programs which are available on various

storage media (such as disks, CD-ROMs, and DVDs), or both, and employs digital apparatuses (PCs, digital TVs, mobile phones, and other digital apparatuses).

**Legal (Information) Design:** Legal (information) design is an emerging, application-oriented discipline in jurisprudence. Fully committed to a holistic approach, it designs legal information by giving it new, tactile, and multi-dimensional shape. This involves visualizing legal information, for instance, shaping it to meet educational and counselling needs. It draws on a range of disciplines, including (legal) iconography, visual communication, educational studies, learning and cognitive psychology, and counselling studies (on legal information design, cf. http://www.inderscience.com/ijlid).

**Legal Information:** The term refers either to the process of providing or gathering information in relation to legal or legally relevant knowledge or to the contents themselves, that is, the legal or legally relevant knowledge conveyed (on the relationship between *information* and *knowledge*, e.g., Lang, 2002, p. 26; on the notion of legal information, cf. Poledna, 2004, p. 69f; http://www.inderscience.com/ijlid).

**Whiteboard:** "A whiteboard is a virtual blackboard, an electronic workspace which two or more users can share to work in a synchronic fashion; whiteboard software applications are operated in application-sharing modes" (Back et al., 2001, p. 302)**.** "A shared window used in video conferencing, similar to a board, where sketches, images, drawings, and so forth can be posted. This window appears on all joint users' screens and can be altered at any time" (http://www.computerlexikon.com. Retrieved January 28, 2005).

# Legal Issues for E-Government in Developing Countries

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## INTRODUCTION

The development of government online should be seen as an evolutionary process (Morison, 2003). The rate of evolution depends on complex factors (Morison, 2003), including perceived incompatibilities between cultures and technologies, an idealistic preference for self-reliance, and a simple lack of economic or human resources to acquire and utilise the technology. Notwithstanding these causes, effective use of ICTs is biased by race, gender, and location. However, the technologies have been developed to a large extent in and for the cultural and social norms of a small number of developed countries. Although there are global flows of knowledge, skills, and artefacts from the epicenters of e-government in the industrialised world to transitional and developing economies, these flows are more unidirectional transfers than bidirectional exchanges (Minogue, 2001). This article attempts to provide a cognitive map of two of the major issues. First, it provides an overview of the legal issues related to e-government from the perspective of developing countries, and second, it critically examines how far technology leapfrogging could serve as an alternative pathway toward development of e-government in developing countries.

## DIFFUSION OF E-GOVERNMENT IN DEVELOPING COUNTRIES

"The information revolution should be geared towards enhancing global citizenship and global economic prosperity; a diversity of paths towards the achievements of national information societies should be respected; the evolution of policy for the development of an equitable global information society should be co-ordinated internationally to ensure the sharing of information and resources" (Mandela, 1995). There are many definitions of e-government, and the term itself is not universally used. Definitions of e-government range from "the use of information technology to free movement of information to overcome the physical bounds of traditional paper- and physical-based systems to the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees" (Basu, 2004, p. 110). Similarly, e-governance is more than just a government Web site on the Internet. The strategic objective of e-governance is to support and to simplify governance for all parties: government, citizens, and businesses. Therefore, the objectives of e-governance are similar to the objectives of good governance. Good governance can be seen as an exercise of economic,

*Table 1. Factors impeding an enabling e-government environment in developing economies*

| | |
|---|---|
| Intuitional Weakness | • Insufficient planning<br>• Lack of clear objectives<br>• Inadequate systems |
| Human Resources | • Shortage of qualified personnel<br>• Lack of professional training |
| Funding arrangements | • Project costs underestimated—cost overruns<br>• Insufficient project funding<br>• Unfinished/incomplete projects<br>• Unsustainable projects |
| Partnerships | • Lack of vendor representation and support |
| Technology and Information Changes | • Inappropriate hardware/software<br>• System incompatibility<br>• Inability to interface to legacy systems |

political, and administrative authority in order to better manage affairs of a country at all levels (Backus, 2001).

Most developing countries understand the enormous potential of ICT, not only as a tool for improving governance and creating more jobs, but also more significantly as a means to enhance the standard of living of the people. Although the policy statements differ from country to country, there are some fundamental similarities in the objectives, which can be summarised as follows:

- Establishment of an information infrastructure that comprises a high-speed broadband communication backbone, nodes, access network, distributed data warehouses, and service locations in order to cater to the needs of trade, commerce, industry, and tourism, and also to enhance the delivery of government services to the people.
- Facilitation of the flow of direct investments.
- Development of human resources for ICT through increased use of ICT in educational institutions and through academic and training programmers that improve the employability of educated youths in the ICT sector.
- Facilitation of decentralised administration and empowerment of people through the application of ICT (Basu, 2004).

Behind the hi-tech glamour of these promises, however, lies a dirty reality that the majority of projects are failures (Heeks, 2003). In order to explore this further, we can divide e-government initiatives into three camps:

- **Total Failure:** The initiative was never implemented or was implemented but immediately abandoned.
- **Partial Failure:** Major goals for the initiative were not attained and/or there were significant undesirable outcomes.
- **Success:** Most stakeholder groups attained their major goals and did not experience significant undesirable outcomes (Heeks, 2004).

There is very little data about rates of success and failure of e-government in developing countries. Failure is certainly the dominant motif of multiple-case studies of e-government in such countries, but these studies have produced no statistical data. Hence, I have relied on the research done by Richard Heeks (2004), which produced the following working estimates for e-government projects in developing/transitional countries:

- 35% are total failures.
- 50% are partial failures.
- 15% are successes.

Is the occurrence of failure a problem? It is in a very direct sense because of the economic opportunity costs of resource investment in e-government failure as opposed to success.

## E-GOVERNMENT AND LEGAL ISSUES

The success of e-government initiatives and processes are highly dependent on government's role in ensuring a proper legal framework for their operation. A requirement for e-government processes to be introduced and adopted is their formal legal equivalence and standing with the paper process. OECD governments are aware of the need for a framework in which to provide enforceable electronic transactions, both in the e-government sphere and for e-commerce, and have taken action. For example, the legal recognition of digital signatures is necessary, if they are to be used in e-government for the submission of electronic forms containing sensitive personal or financial information. The key concern for developing countries is to identify the legal issues. As explained before in this article, it would not be difficult to provide definitive guidelines for developing countries regarding what type of legal safeguards would be necessary to protect the interests of the government and to create binding and enforceable obligations on the government; however, each of the developing countries is in a different stage or phase of e-government and differs in its political aspirations and structure of government. Hence, the requirements would differ and so would the courses of action.

Developing countries would face few key questions in converting to or adopting electronic processes. Initially, the first question that would arise is the question of legitimacy. Legitimacy may express itself through expressions of authority to act, which is related to but not the same as saying that an action is not illegal. In some settings, the legitimacy of government action would affect the enforceability of the action, either on the part of government against a person subject to that government's rule or on the part of a private citizen against the government. Hence, to provide legitimacy to act electronically can only be conferred by legislative measures and supported by an effective legal framework. This framework should be capable of identifying and addressing legal obstacles to e-government. Legal obstacles may include the differences that exist between traditional data collection requirements (i.e., sharing information collected by and provided to various government agencies) and the ease of collecting and sharing data electronically.

Legitimacy also turns on the standards of appropriateness. What kind of qualities should e-government action

have, or what standards should it meet in order to achieve the desired level of legitimacy? In certain situations, an electronic process would prove to be good enough to meet its legal needs without regard to whether it is comparable to or as good as its prior process. At the other extreme is the situation in which electronic conversion would require a complete reengineering of a course of action in order to address the legal risks and issues that a particular system presents or that are not being addressed as effectively in the existing system. Since due to lack of resources, most developing countries would still depend largely on their existing paper-based systems as a reference point in their analysis, the legal framework would require them to have a point of compatibility, which would be quite unique for developing countries. As the situation stands, at least in the near future, most of these developing countries would require having both systems of transaction. In order to achieve the legislative revisions, enactment would be required, as current laws, rules, and regulations might not recognise the legality of electronic documents and processes. For example, legislation should ensure that electronic authorisations, contracts, and signatures would have the same legal effect as those on paper. (However, due to the nature of technology, giving them the same legal effect may change or even eliminate the traditional ways in which these items are completed, such as notarizing a document). Additionally, governments may consider the required quorum at meetings to be met through the electronic participation of officials rather than by the officials' physical presence.

It can be said that much of what a government or those who deal with a government would look for in an electronic communication is a latent degree of assurance regarding the security of communications and their sources, or who sent them. Any user would be concerned primarily about the integrity of the information communicated in the sense that it is trustworthy and that it has not been altered since it was sent. Similarly, the concern also would be about jurisdiction; however the issues relating to jurisdiction would be similar for both developed and developing countries. The only point of concern is how it would be addressed. E-government for developing countries also would put the judicial system of these countries to test. Generally, the judiciary in these countries is not always in tune with the use and advancement of technology.

Electronic communications appear particularly susceptible to attacks on privacy. In most of the developing countries, privacy is a softer issue, and hence, even with proper legal framework, it can be argued how far privacy of personal information would be maintained. Likewise, fair access to public services is one element that would bring back the issue of digital divide within the developing countries—providing facility to the more able citizens. At some point, this would cause the law to impose constitutional limitations on government's ability to move wholly online in order to maintain equality (Krebs, 2001). The legal status of government documents is always of high importance simply because of the weight of authority. People see this in the priority they frequently are given in evidence statutes. This could be considered as a higher form of authenticity accorded to these records, but it has an impact on the demands made of electronic communications, so that they would deserve the same respect that paper documents receive. Pushing this theme further, it can be argued that the integrity that the public expects of government communications is not just that they are unaltered but that their content is true. That is not a question of the medium used.

Finally, government use of electronic communications has to be politically acceptable to the opinion makers of a society. No amount of technical excellence can guarantee that any manifestation of e-government would meet this standard. One does hear from politicians and sometimes from business people that government should lead the way to making people confident about electronic communications being safe and effective. This is a technical aspect of the legitimacy argument that proper government use can encourage general use of paperless records, but how far the governments in developing countries and, particularly, the politicians themselves are comfortable with the technology is a matter of debate. Not all of these concerns are related specifically to developing countries, and neither do all these concerns rise to legal consequences. Any discussion about e-government for developing countries could not be made without discussing these issues; however, the difference is in the level of priorities. Some factors would play more important roles in some governments than in others. Ideally, a legal framework that allows for the implementation of e-government processes and services will do the following:

- Preserve basic public policy goals such as privacy and security, retention, and public access to information.
- Provide the statutory basis of, authority for, and regulations related to the government processes and services that may be supplied electronically.
- Assign responsibility for and ownership rights to the data provided and accumulated electronically.
- Address the sharing of data collected by one government agency with other government agencies that require the same information.
- Clearly define jurisdictional responsibilities related to intergovernmental transactions and business-to-government transactions.

- Provide a mechanism by which legal requirements are recognised and enforced.
- Provide a basis for the establishment of fees related to electronic processes and services.
- Identify the records that should be maintained, the period of retention, and the required storage media.
- Not be technology-specific or favour one form of service delivery (traditional or electronic).
- Minimise costs and the potential for litigation.

## FUTURE TRENDS

### Technology Leapfrogging for a Connected Future

There has been much discussion on the issue of convergence of less developed economies since the classical work of Solow (1957). Solow's (1957) studies highlighted that poor and developing countries will converge faster than the developed countries, when the capital stock and output are lower than their steady state levels. One of the key assumptions in these studies is that developing countries have access to technology and markets that is equal to developed countries. However, several empirical evidences showed that these assumptions may not hold.

The feasibility of having a successful e-government is directly dependent on the government's overall ability and readiness to spend money on the necessary information technology and related costs (Basu, 2004). There is a substantial spending difference between developed and developing economies, which is quite apparent if we look into conventional budgetary structures. An e-government infrastructure in general comprises network infrastructure, security infrastructure, application server environment, data and content management tools, application development tools, hardware and operating systems, and systems management platform. However, many developing countries do not have the technology to develop the infrastructure necessary to deploy e-government services throughout their territories. A constructive way to overcome this problem is what is known as *technology leapfrogging*.

The specific use of IT to accelerate development and to promote economic growth often is referred to as technology leapfrogging—the implementation of a new and up-to-date technology in an application area in which at least the previous version of that technology has not been deployed (Antonelli, 1991). In developed economies, newer versions of technology often are used to upgrade older versions, but in developing economies, where older versions of technology often are prevalent, leapfrogging over the successive generations of technology to the most recent version creates more possibilities and often provides access to newer, more efficient, and often cheaper alternatives to traditional capital-intensive technologies (Working Group of the Pacific Council on International Policy, 2002)..

In the conventional view (i.e., as seen by technology developers and donors), developing countries passively adopt technology as standard products that have been developed in industrialised countries and that can be employed usefully and immediately. However, successful use of IT requires much more than mere installation and application of systematised knowledge. It also requires the application of implied knowledge regarding the organisation and management of the technology and its application to the contextual environment in which it is to be used. This implied IT knowledge often represents experience with the deployment of previous technology accumulated over time, such experiences contributing toward the shaping of new technology. If these earlier experiences are lacking, this may inhibit the accumulation of knowledge, which is required in order to make the new generations successful. Furthermore, new techniques frequently require modifications, if they are to be applied successfully to a new environment, and such modifications generally require a high level of skill.

The learning processes of organisations and societies often are constrained by their past practices, their existing knowledge base, and their propensity for innovation. Consequently, while leapfrogging may appear as an attractive option for late adopters, it may not provide the intended results in all circumstances. The greatest danger is that a new cargo cult may arise, where developing economies observe the benefits that later and succeeding generations of IT bring to industrialised nations. Hurrying to acquire the same technology, developing countries rely on the blind belief that similar benefits will quickly accrue to them. Such opportunities may exist, but a reality check is appropriate in order to protect the investment of the scarce resources available for IT in most developing nations and to distinguish between the circumstances where leapfrogging may or may not be successful.

As the situation stands today, it is in the interest of developed countries to play an important role in promoting technology adoption in developing countries with international organisations such as the United Nations or the World Bank providing the necessary funds. However, pushing e-government initiatives in order to achieve a significant impact on establishing a digital society and a connected economy could prove to be an elusive goal without proper investments in basic services such as healthcare and education. E-government solutions and approaches used in developed countries also may prove inadequate without a clear understanding of local constraints and conditions.

## CONCLUSION

E-government is an unlikely key for bridging the digital divide. The notion that technologies can prescribe their own courses of action is mythical; the responsibility for technological outcomes lies in the social order of individuals, groups, and institutions through which lives are organised (Shimmon, 2000). However, there is synergy to be created between technology and social context. This is not deterministic synergy; it will vary by context and, therefore, will entail adaptation of the technology and social context. If there is no prior experience in using computers, then there is probably no relevant social context. In some aspects, this may make it easier to introduce new technology, as there will be no old values or contexts to change; however, a context has to be created. If the existing context for information is informal or non-paper-driven, automation may be difficult. In both situations, new rules will have to be learned and accepted. When leapfrogging, one must be careful to identify both technical and social considerations, ensuring that technology is not embedded to the detriment of the social. Further, one should not assume that there is only one way to leapfrog; all social contexts will have one or more different leapfrogging solutions. As such, truly interactive e-governance remains a goal for developed and developing nations alike. Table 2 summarises some of the key challenges with which developing economies are faced in the development of e-government in developing countries.

*Table 2. Worksheet for developing economies*

| Key Challenges | Recommendations |
|---|---|
| Infrastructure Development | • Develop projects that are compatible with the economy's telecom infrastructure<br>• Consider public access kiosks and mobile centres if teledensity is low<br>• Introduce telecom competition and remove regulations on wireless and other digital technologies in order to accelerate deployment<br>• Bring connectivity to underserved areas and ensure sustainability<br>• Assess government's historic and current use of technology in order to learn from past successes and failures<br>• Establish a realistic development timeframe |
| Legal Framework | • Legislature must ensure that laws and policies support rather than impede e-government<br>• Policymakers implementing e-government must consider the impact of current laws and policies<br>• Consult with all stakeholders in order to assess how existing frameworks may impede the development of e-government<br>• Give legal status to online publication of government information<br>• Clarify laws and regulations in order to allow electronic filings with government agencies<br>• Reform processes by simplifying regulations and procedures |
| E-Literacy | • Be careful not to marginalise groups of people solely on the basis of e-literacy<br>• All e-government projects should include an educational component<br>• Provide aides at public access points to help train citizens in basic computer skills<br>• Ensure that content is in the local language<br>• Make sure that all user interfaces are easy to use and that Web site navigation is solid |
| Accessibility | • All governments must serve all members of society, irrespective of their physical capabilities<br>• All online services must be designed with global accessibility standards in mind |

*Table 2. Worksheet for developing economies (cont.)*

| | |
|---|---|
| Privacy | • This is one of the most important issues facing governments today<br>• Governments collect vast amounts of data on their citizens, and extra precaution must be taken to ensure the privacy of citizens' personal information<br>• Privacy issues must be addressed in the planning and design stages of all e-government systems<br>• Educate and train government officials in the importance of privacy<br>• Design applications that integrate privacy protections<br>• Minimise the collection and retention of personal information<br>• Limit access to the databases of citizen information by government employees |
| Security | • Security must be addressed early in the design phase<br>• Security breaches can shatter public trust in e-government, and getting it back is nearly impossible<br>• Trust is a critical component of e-government; without it, citizens will not use the systems<br>• A senior government official needs to be responsible for managing security issues; this individual must be knowledgeable in all aspects<br>• All government employees must be trained on the importance of maintaining the highest level of security<br>• All systems should keep information collection to an absolute minimum, and proper controls must be in place to ensure that databases cannot be compromised |
| Transparency | • Government transparency should be embedded in the design of all systems<br>• E-government can play an essential role in helping governments demonstrate transparency to citizens<br>• All Web sites should post rules, regulations, and requirements for all government services<br>• Citizens should be able to track the status of their online applications<br>• Many high-ranking government officials use the online environment to demonstrate principles of open government and transparency |

It is possible, however, that as developing countries continue implementing e-governance strategies, those with advanced foundations will address citizen needs in ways not yet seen in developed countries. The aim should be to provide citizens with convincing content and services that meet their essential needs. Perhaps the future is connected to the have-nots, but keeping them connected will be the real challenge.

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## KEY TERMS

**Digital Divide:** The stratification of people according to access to interactive computer-based technologies; on one side, groups and individuals possessing the ability to participate within the network society and on the other, those who are absent or excluded from it.

**Digital Signature:** An authentication technology providing confirmation of origin, assurance of integrity of the content, and non-repudiation.

**E-Governance:** The strategic objective of e-governance is to support and to simplify governance for all parties (government, citizens, and businesses).

**E-Government:** Focuses on the use of new information and communication technologies (ICTs) by governments as applied to the full range of government functions. In particular, the networking potential offered by the Internet and related technologies has the potential to transform the structures and operations of government.

**Electronic Authentication:** A process that attests to the attributes of participants in an electronic communication or to the integrity of the communication.

**Information Communication Technology (ICT):** Includes any communication device or application encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems, and so forth, as well as the various services and applications associated with them, such as videoconferencing and distance learning. It also can mean technologies used for accessing, gathering, manipulating, presenting, or communicating information.

**Legislation:** The act of making or enacting laws.

**Technology Leapfrogging:** The term for shortcutting technology development. This concept highlights the possibilities for developing countries to introduce state of-the-art technology and to become the first to adopt modern technologies.

# Legal Knowledge Systems

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## INTRODUCTION

There are many conceptions of e-governance (Malkia, Anttiroiko, & Savolainen, 2004; Reinermann & Lucke, 2002). Our view is that e-governance is about the use of information and communications technology to improve the quality and efficiency of all phases of the life cycle of legislation. In this conception, computer models of legislation play a central role. We use the term "model" in a broad way, to cover every kind of data model of legislation or metadata about legislation, at various levels of abstraction or detail, including full text, hypertext, diagrams and other visualization methods, and legal knowledge-bases using Artificial Intelligence knowledge representation techniques. The appropriate kind of model depends on the particular task to be supported.

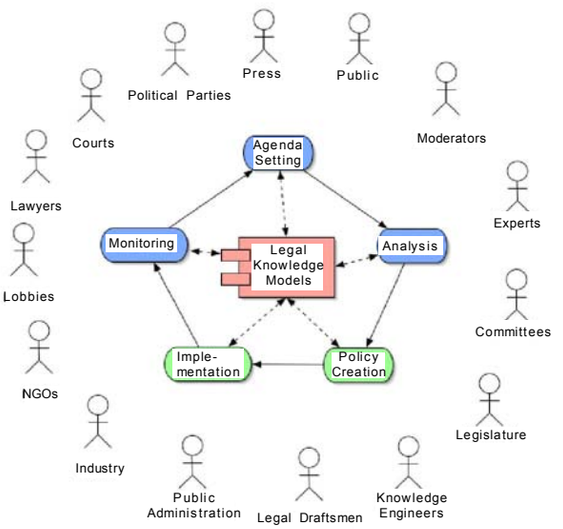
In this article, the focus will be on the use of legal knowledge systems (LKS) to support the implementation phase of the life cycle of legislation. Legal Knowledge Systems are also known as legal knowledge-based systems (LKBS). LKS can greatly improve the correctness, consistency, transparency and, last but not least, the efficiency of the administration of complex legislation.

The rest of this article is organized as follows. The next section explains the relevance of legal knowledge systems for governance. This is followed by a section motivating the use of LKS to support tasks in the implementation phase of the life cycle of legislation and providing a brief introduction to LKS technology. Next, various application scenarios for implementing public policy and legislation using LKS are discussed. Although research on technology for legal knowledge systems continues, it is a mature technology with many impressive applications in regular use by public administration. The article concludes by reiterating its main points and identifying open research issues.

## BACKGROUND

As shown in Figure 1, based on a diagram in Macintosh (2004), governance can be viewed cybernetically as a class of control systems. Many of the kinds of actors involved in governance are illustrated in Figure 1, including the press, political parties and lobbies, non-governmental organizations (NGOs), the general public and various governmental actors.

*Figure 1. The life cycle of legislation*




All phases of the life cycle of legislation create, use, maintain, or evaluate computer models of legislation and other sources of norms (e.g., regulations, court cases, and best practices). These are called legal knowledge models in the figure. One could distinguish between the full text of the legal sources and metadata, abstractions, or models of these sources, but for the sake of simplicity, a full text database of some legal source is viewed as a kind of computer model.

This model of governance leads to the following definition of e-governance: the use of information and communications technology to improve the quality and efficiency of all phases of the life cycle of legislation. In this conception of e-governance, computer models of legislation and other sources of norms play a central role. The appropriate kind of model depends on the particular task to be supported. In the rest of this article, the focus will be on ways to use a particular class of models, legal knowledge systems (LKS), to support the implementation phase of the life cycle of legislation. There are also important applications of LKS for other phases of the life cycle, in particular to support policy creation and legislative drafting. Conversely, other ICT technologies have a

role to play in the implementation phase, such as business process reengineering and workflow management systems. But these subjects require separate explication.

## INTRODUCTION TO LEGAL KNOWLEDGE SYSTEMS

Computer models of legal rules and regulations for helping public agencies to administer complex legislation are nothing new. A large part of IBM's growth in the 1950s was due to the successful adoption and proliferation of large data processing applications for administering taxes and social benefits in the public sector. From the beginning, computer models of legislation have usually been implemented procedurally: applying knowledge of the law and administrative procedures, a step-by-step procedure is designed and then implemented in computer code for guiding clerks through the process of applying the legislation. The overwhelming majority of software applications for administering legislation are still implemented this way, although modern programming languages, such as Java, are replacing COBOL and new software engineering methods for modeling procedures, such as activity diagrams of the Unified Modeling Language (UML), have largely replaced flow charts.

Procedural models of the law are expensive to build and maintain as the law changes. Since knowledge about the law is tightly intertwined in the procedural approach with knowledge about how to solve a particular legal or administrative task, it is very difficult to reuse models in different applications of the same law to reduce development and maintenance costs. In the 1970s, interdisciplinary research between lawyers and computer scientists began on ways to model the law and support legal reasoning, based on a deeper understanding of the law and legal processes (Buchanon & Headrick, 1970). An active international research community, going by the name of Artificial Intelligence and Law[1], was founded and grew in the 1980s. This community, as part of the larger field of artificial intelligence (AI), developed methods and technologies for modeling legislation, regulations, and case law and supporting a variety of legal reasoning tasks, using rule-based systems, case-based reasoning systems and other AI methods. See (Rissland, Ashley & Loui, 2003) for a recent overview of the Artificial Intelligence and Law field.

In the mid 1980s, the first prototype legal applications of rule-based systems for public administration began to appear (Sergot et al., 1986). Initially these were often called legal expert systems, because the focus was on modeling the expertise of legal experts. Today the broader term legal knowledge systems (LKS) is usually used. It is broader in two ways: (1) it includes the use of all possible sources of legal knowledge, especially original, authoritative legal texts, such as legislation and case law, in addition to the commentary or opinion of legal experts; and (2) it includes all ways of modeling legal knowledge using computers, such as case-based reasoning methods or so-called neural networks, in addition to rule-based technology.[2]

The first production applications of legal knowledge systems for public administration began to appear in the late 1980s and early 90s. The Australian company SoftLaw[3], for example, was founded in 1989. SoftLaw's entire business is based on "the provision of its legislative rule-based technology and related methodologies and services to test, capture, execute, and maintain the complex legislative and policy rules that are used by government and regulatory agencies to administer government programs."

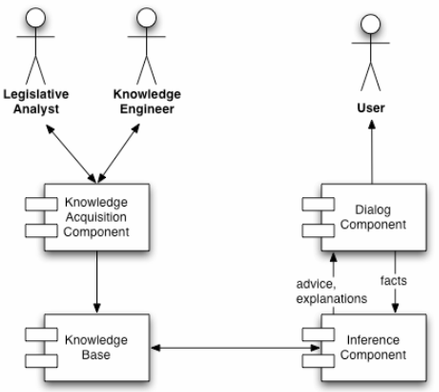
One of SoftLaw's first production applications was a rule-based system for the Australian Department of Veteran's Affairs, to help administer the entitlements of veterans to pensions and other benefits. An independent audit of the agency's performance had shown that decisions were often highly inconsistent, lacked adequate grounds or justification or incorrectly calculated entitlements. These quality issues were the primary motivation to reform the process using legal knowledge systems. In addition to resolving these quality problems, SoftLaw claims the use of LKS led to an 80% productivity increase.[4]

Some more recent projects and applications include a legal knowledge system developed for the Dutch Tax Authority in the context of the European POWER project (van Engers, Gerrits, Boekenoogen, Glassée, & Kordelaar, 2001) and a feasibility study for the German county of Herford on the use of an LKS to support clerks with the assessment of support obligations of family members for their elderly parents (Glassey & Gordon, 2005). SoftLaw collaborated with Northgate Information Solutions to build a Web-based legal knowledge system for the British government, called Assert, which helps citizens to assess their entitlements to a wide-range of housing-related welfare subsidies.In the United States, the Department of Labor has published over 20 legal knowledge systems on their Web site, to help employers and employees to understand their labor law rights and obligations.[5]

Although there are different approaches to building legal knowledge systems, at a certain level of abstraction they all have the same basic architecture and share the same set of features compared to the conventional, procedural approach to building legal decision-support systems (Fiedler, 1985). The basic LKS architecture is shown in Figure 2.

As shown in this figure, an LKS consists of four main components:

*Figure 2. Architecture of legal knowledge systems*




- The *knowledge acquisition component* is a specialized kind of computer-assisted software engineering (CASE) tool and integrated development environment (IDE) for legal knowledge systems. Notice that CASE and IDE tools are integrated in the LKS methodology. As in model-driven architectures (MDA), the executable application is generated automatically from its design; rather than programmed manually. Ideally, models of the law and regulations are cleanly separated from procedural knowledge about how to apply the law to solve a particular legal task. A knowledge acquisition component will include tools for separately modeling the relevant laws, task-specific procedural knowledge and related supporting documentation and a way to link these elements to define complete applications. Developing a legal knowledge base is a collaborative effort requiring software engineers specialized in knowledge systems, called knowledge engineers, and experts in the legal domain, such as legislative analysts. A knowledge acquisition component may provide particular support for the collaborative aspects of the knowledge acquisition process.
- The *knowledge base* component is a product of the knowledge-acquisition process. It is a declarative computer model of the selected legal sources.
- The *inference component*, also known as an *inference engine*, is the part of the runtime environment that applies the knowledge base and facts and other information provided by the user to generate questions, answers and explanations.
- The *dialog component* is the part of the runtime environment responsible for managing the interaction between the system and the user. It is responsible for keeping track of the state of the dialog, applying discourse and rhetorical knowledge so as to interact with the user in a supportive and collaborative way and translating between any formal representation languages used by the knowledge base and some natural language understood by the user. It is closely connected to the user interface of the system but not necessarily a part of it. Several different user interfaces, each with a different look and feel (e.g., for the Web, various operating systems, personal digital assistants or cell phones), may be able to use the same dialog component.

The advantages of LKS for implementing support systems for the public administration of complex legislation and regulations are manifold. Cleanly separating the model of the legal domain from task-specific, problem-solving code makes it much easier to maintain and verify the system as the legislation or regulation is amended. This reduces development costs and improves the "time to market" (i.e., the time required to get the revised system up and running), making the updated service available to citizens and other "customers" of the public agency. The ability of an LKS to generate clear explanations, with supporting references to the primary legal sources (statutes, cases, etc.), improves the transparency, acceptability, and traceability of administrative decisions.

The dialog component of an LKS provides a much more flexible form of interaction with users than conventional data processing applications. The conventional way is data driven: all possibly relevant information is collected from the user, by filling out a form, the data is then "processed" procedurally to produce an output and, finally, this output is formatted in a report. The interaction with the user in an LKS is goal driven: the user asks a question and the system asks for only as much input from the user as required for answering the question. The user retains control of the dialog at all times. The goal can be changed. Previous answers can be modified. The user can ask why a question is being asked.

In summary, legal knowledge systems provides substantial opportunities to improve the correctness, consistency, transparency, and efficiency of the assessment of claims, compared to conventional data processing methods.

## APPLICATION SCENARIOS

E-government applications are often categorized using a layered model, starting with the provision and dissemination of information, continuing with support for communication and collaboration between governmental

agencies (G2G), businesses (G2B) and citizens (G2C), and ending with providing support for transactions. The kinds of transactions that have been put online are typically quite limited. The usual examples include applications for dog licenses, change of address notifications or the registration of business names. These are all simple or "shallow" transactions requiring little or no legal reasoning. LKS provide the opportunity to broaden the scope of the kinds of transactions that can be brought online to include *deep transactions* (i.e., the determinative processes requiring detailed knowledge of complex legislation and regulations) (Johnson, 2000), such as social security or tax administration.

Johnson identified four application scenarios of LKS for supporting determinative processes: intelligent data collection, one-stop shops, outsourced services and, finally, self-service (Johnson, 2000).

Moving existing paper forms onto the Web, using for example the Portable Document Format (PDF), is reminiscent of early automobiles designed as horseless carriages. It fails to appreciate the full potential of the new technology. The *intelligent data collection* scenario makes use of the flexible dialog component of an LKS to provide a much more powerful, user-friendly and interactive way to collect information from a user. Since the dialog is goal-directed and problem-focused, only relevant data is collected. This enables the agency to reduce the time required of the user to provide the information or to collect more detailed, but still relevant, data without increasing the burden on the user.

The idea of a *one-stop shop* for delivering public services is to reorganize public administration by joining the front offices of various departments into a single front office. Although this is primarily an organizational change, it is made more feasible by the use by advanced information and communications technology. For example, e-mail and other forms of computer-supported communication can be used to help overcome the increased distance between front and back offices, which used to be located together in the same building. LKS also have a role to play here. If a one-stop shop is to be more than a pamphlet counter, it must be capable of actually delivering services and not just information about services. That is, front-office personnel must be capable of making administrative decisions requiring the application of detailed knowledge of law and regulations. Since a one-stop shop provides a wide variety of services, this is only feasible if the lack of specialist knowledge by front-office staff is compensated by the use of LKS and other decision-support systems. LKS empowers front-office personnel to reliably make correct decisions, without specialist knowledge of legal details. This scenario changes the role of the back office. Instead of processing forms to decide cases, the back office can take responsibility for developing and maintaining the knowledge bases needed by the LKS applications. Moreover, the shift of responsibility for processing applications and claims to the front office frees up capacity of the back office to perform more extensive and thorough audits, assuring information provided by users is correct and backed by sufficient evidence.

There is a trend towards *outsourcing* public services to private companies, for example by forming *public-private partnerships*. But responsibility for determining entitlements and making other administrative decisions requiring a deep understanding of complex legislation and regulations cannot be outsourced unless there is some way to assure the personnel of the private company will correctly apply the law. Legal knowledge systems provide a way to achieve this. The public agency retains control over the development of administrative policy, by creating regulations interpreting legislation and modeling these regulations in the knowledge base of an LKS. The explanations produced by an LKS provide an auditing trail enabling the agency to review decisions made by the private partner. Performance can be precisely monitored. New distribution channels for public services become feasible. For example, automobile dealers could perhaps process applications for car licenses, similar to the way they now serve as agents for insurance companies, and provide a one-stop shop for the "buying a car life event," including the whole package of a car, car insurance, and car license. If being able to provide this service helps to sell more cars, public administration may be able to outsource this service at low cost, or perhaps no cost. This scenario would be a win-win-win opportunity for consumers, car dealers and public administration.

The final application scenario for LKS we consider here is *self-service*, where a citizen or other user interacts directly with the LKS, for example via a Web interface, optionally with the assistance of a lawyer, tax consultant, or other personal advisor. This scenario is not as novel or ambitious as it may seem at first glance. After all, citizens and business are expected to know and abide by complex legislation when managing their daily affairs. And in some cases, public administration already expects citizens to process their own claims and applications, for example when completing their yearly tax returns. But LKS makes this way of delivering services viable for a much broader ranger of determinative processes. The benefits to public agencies include a reduction in the amount of personnel resources required for processing claims, freeing up staff for other tasks, such as policy development, auditing and monitoring. Citizens too would experience benefits. They would be able to process their applications from their home, at their own convenience. They would quickly obtain a decision, or at least a preliminary decision, together with a

thorough and comprehensible explanation. Finally, citizens would be able to analyze the legal consequences of hypothetical situations, to help them to plan for the future. This example shows how LKS not only can help to improve the quality and efficiency of an existing public service, but enable completely new services.

## FUTURE TRENDS

The cybernetic view of governance places legal knowledge at the center of the cyclic process of policy-making, legislative drafting, policy implementation and administration, monitoring and evaluation. Managing the life cycle of legislation is of central importance for governance. Since much work on governance focuses on organizational or communication issues related to the trend away from hierarchical towards networked forms of management and collaboration, the central role of public policy, legislation and regulations as the primary instruments for guiding and directing society may need emphasizing.

The important role of legislation for governance leads to an increased awareness and appreciation of the potential of legal knowledge systems for eGovernance. It can be anticipated this will lead to a renewed interest in legal knowledge systems by public administration.

Most efforts of public administration to bring transactions online have been restricted to shallow transactions, such as change of address notifications. Only when deep transactions are supported (i.e., those transactions requiring the application of complex legislation and regulations), will the full potential of information and communications technology for improving the correctness, consistency, transparency, and efficiency of determinative processes of public administration be realized. Legal knowledge systems provide an advanced and effective technology for realizing this potential.

Possible topics for future research include applying business process re-engineering methods to analyze the organizational implications of legal knowledge systems. How is the distribution of roles and required skill profiles affected? Can the efficiency and productivity increases reported in the literature be explained and confirmed? Another topic concerns possible dependencies between the complexity of legislation and legal knowledge systems. Is there a danger that the use of legal knowledge systems might exacerbate the trend towards ever more complex legislation? Or can the quality of legislative drafting be improved using LKS methods, resulting in simpler, clearer laws and regulations?

## CONCLUSION

Now that legal knowledge systems have been successfully deployed in a number of important production applications by public administrations in Australia, the Netherlands, the United Kingdom and the United States, and a small but growing LKS industry has emerged, there is every reason to believe that the time for a rapid adoption and expansion of legal knowledge systems in public administration has come.

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## KEY TERMS

**Artificial Intelligence:** The branch of computer science which develops computer models of reasoning and problem solving methods and decision support systems applying such models.

**Cybernetics:** The science of control systems.

**Deep Transactions:** The processes of public administration which determine rights (e.g., for social benefits) and obligations (e.g., income taxes) by applying complex legislation.

**Dialog Component:** The part of a knowledge system responsible for managing the interaction between the system and the user.

**E-Governance:** The use of information and communications technology to improve the quality and efficiency of all phases of the life cycle of legislation.

**Inference Engine:** The part of a knowledge system which applies the model of the domain to the facts provided by the user to draw inferences, ask questions and generate explanations.

**Knowledge Acquistion Component:** The part of a knowledge system which provides modeling and other development tools for building and testing knowledge bases.

**Knowledge Base:** A computer model of the concepts, rules, cases, and other kinds of knowledge of some application domain.

**Knowledge System:** A computer program, or suite of computer programs, for developing and using knowledge bases to solve problems.

**Legal Knowledge Model:** Any kind of data model for legal knowledge, including full text databases, hypertext, diagrams and other visualization methods and legal knowledge bases developed using Artificial Intelligence technology.

**Legal Knowledge Systems:** A broad term used to cover all applications of information and communications technology for supporting the acquisition, use, structuring, dissemination and maintenance of legal knowledge.

## ENDNOTE

1 The leading international organization in the field is the International Association for Artificial Intelligence and Law (IAAIL), which organizes the International Conference on Artificial Intelligence and Law (ICAIL).

2 Legal knowledge systems are also known as "legal knowledge-based systems." But the trend is to use the term "legal knowledge systems." For example, the yearly conference of the JURIX Foundation changed its name from Legal Knowledge-Based Systems to Legal Knowledge and Information Systems in 2000. The name "legal knowledge systems" broadens the field to also include legal applications of knowledge management methods and technology and helps to emphasize that these systems are not only based on legal knowledge, but comprehensively support the acquisition, use, structuring, dissemination, and maintenance of legal knowledge.

3 The company SoftLaw changed its name to RuleBurst in 2005.

4 Of course, such claims should be taken with a grain of salt until they have been empirically replicated and verified by independent research.

5 http://www.dol.gov/elaws/

# Level-Based Development of E-Government Services

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## INTRODUCTION

As the Web is growing exponentially, the way of provision governmental information and services has been changed by the newly supplied technological capacities and digital channels. More and more governments all over the world are trying to acquire an electronic profile, in order to offer advanced services to their users (citizens and businesses). Two basic factors have significant contribution to this direction. The first considers the continuous increase of the users' daily needs (e.g., information searching, certificate requesting). Traditionally, the completion of these tasks implies a lot of valuable time to be lost in the tracking of responsible actor and in the waiting in queues. The second one refers to the ongoing access of the users with the Internet. This new way of communication facilitates the transactions and helps in providing better public services.

It is clear that e-government's successful development and operation demands proper design, which will comprise the basis for its application. Information and communication technologies (ICT) may contribute essentially to this direction, as long as government and users adopt them under the framework of a broader reorganization of the public sector. This adaptation can be implemented gradually in levels, which will enable the unobstructed data flow from/to government and will give the opportunity to citizens and businesses to obtain the highest access to the provided governmental services. Only under these circumstances, this transition will lead to a series of strategic, administrative and operational benefits (NOIE, 2003; OGC, 2003), for example, best coverage of users' needs, cost and time savings, and so forth.

This article is intended to present a level-based approach for the development of e-government services, starting from the lowest one to the highest and more complicated. Following gradually this sequence of technological levels and incorporating with strategy, coordination, and know-how, an organization can realize the vision of e-government, provide reliable online information and services to their users and improve their efficiency and effectiveness.

## BACKGROUND

Although the literature relating to this area proliferates, the definition and the various models of e-government are still unclear among researchers and practitioners of public administration. According to the E-Governance Institute (2004),

*E-governance involves new channels for accessing government, new styles of leadership, new methods of transacting business, and new systems for organizing and delivering information and services. Its potential for enhancing the governing process is immeasurable.*

Another quite broad definition, which incorporates its four key dimensions that reflects the functions of government (i.e., e-services, e-democracy, e-commerce and e-management) is the following:

*E-government is the use of information technology to support government operations, engage citizens, and provide government services.* (Dawes, 2002)

E-government can be distinguished into three basic categories: (a) *government to citizen (G2C)* that relates to the relationships between governments and citizens; (b) *government to business (G2B)* that relates to the relationships between governments and businesses; and (c) *government to government (G2G)* that relates to the

*Table 1. Pioneer countries in e-government*

| Country | Description |
|---|---|
| CANADA | Canada's e-government portal offers information and services organized by the target-group in which are attended (e.g. Canadians, non-Canadians, businesses, etc.). Departments and agencies, structure of the government of Canada, provinces and territories, municipalities, new initiatives for Canadians, government contacts, justice and law, public safety, and so forth are only some of the supported services. http://www.canada.gc.ca |
| SINGAPORE | Singapore's government Web site supports three portals for (a) citizens and residents (b) businesses and (c) non-residents. eCitizen is positioned as the first-stop for government services on the Web and enables users to search for and access a diversity of information, as well as to conduct a wide range of online transactions with government agencies (including culture, recreation and sports, defense and security, education, learning and employment, family and community development, health and environment, housing, transport and travel). eBusiness is a gateway to a host of government services ranging from accessing information that is pertinent to businesses, exploring governmental assistance, to filling in important forms needed to start or grow a business. Finally, the portal for non-residents provides information about visiting, relocating, working, studying or doing business in Singapore. http://www.gov.sg, http://www.ecitizen.gov.sg, http://www.ecitizen.gov.sg/nonresidents, http://www.business.gov.sg |
| UK | UK's portal constitutes a trial of British government to provide services via Internet. Today, the portal offers: guidance to government, judicial system, submission of applications for VAT, taxes return, registration to vote, finding local childcare, application to universities, agricultural subsidies from Commission, and so forth. http://www.ukonline.gov.uk |
| USA | USA also has early demonstrated a steady advance in e-government, which is close, related to the fact that they are one of the main providers of software and hardware solutions. The high penetration factor of American citizens in Internet has significantly contributed to reach this fact. Their first portal created for this purpose is an effort to gather all governmental web sites in one place (one-stop shop). http://www.firstgov.gov |

activities that improve and upgrade governments' services (Egov, 2003).

Table 1 presents some of the best practices in e-government worldwide.

## E-GOVERNMENT LEVELS

The application of e-government is not a trivial or straightforward procedure. It demands strategy, management as well as the use of technological tools for planning, design, implementation, and evaluation. So, the transfer from traditional government to an electronic one can be realized gradually in levels (Markellou, Panayiotaki, & Tsakalidis, 2003). These levels, beginning from lowest and advancing in most complicated, are depicted in Figure 1. Specifically, two paths can be identified: (a) the *obligatory upgrade* indicates that when the starting level of an arrow is implemented, then the ending level of the arrow must be implemented as well; and (b) the *optional upgrade* indicates that when the starting level of an arrow is implemented, then the ending level of the arrow may be implemented as well. Moreover, the presented levels are grouped into three sets: (a) the *obligatory levels* are the levels met during the obligatory upgrade path; (b) the *optional levels* are the end levels of an optional upgrade path; and (c) the *obligatory levels if certain path followed"* are the levels that must be implemented when certain optional upgrade paths are followed. In the following paragraphs the description of each level of the proposed approach is given. Levels 1, 3, 4, 5 are proposed for G2G purposes, while Levels 6-13 are proposed for G2B and G2C purposes.

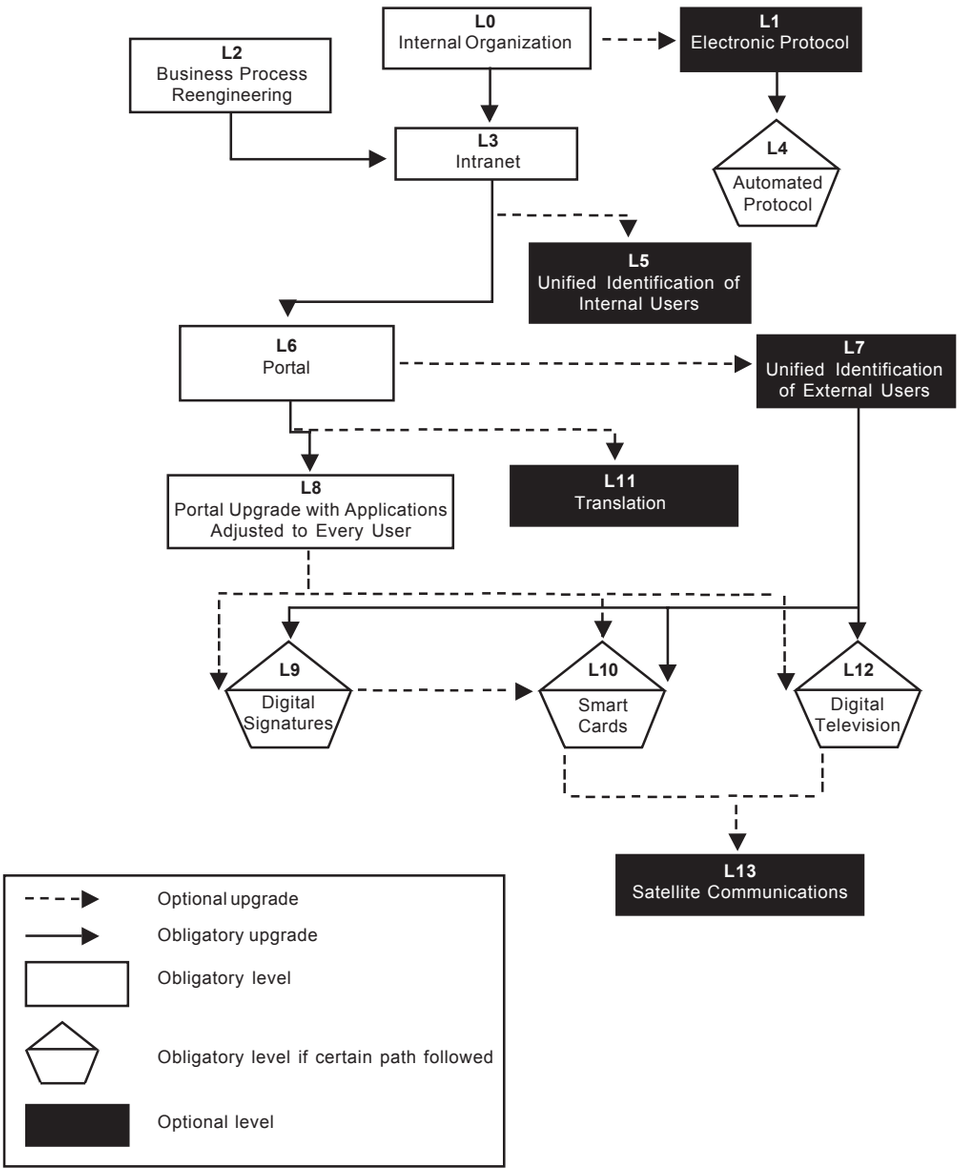
### Level 0: Internal Organization

The lowest level considers the authority's internal organization. This includes the supply of hardware/software infrastructure for office applications, as well as the necessary network interconnection. This level constitutes prerequisite for the implementation of the remainder levels in order to fully support e-government services.

### Level 1: Electronic Protocol

This level refers to the computerization of authority's documents with the passage from the conventional protocol (manuscript) to the electronic one (file). Specifically, the book of incoming/outgoing documents is suppressed and document distribution henceforth is kept electronically for timesaving and facilitation in document searching and recovering. Each service has its own protocol

*Figure 1. Application levels of e-government*




numbering, which is usually granted by the secretary of the specific authority manually.

## Level 2: Business Process Reengineering

This level includes (a) a feasibility study of documents' flow replanning, internal processes interrelation, and authority's flow chart processes preparation for the next level; and (b) specifications, planning and implementation of the applications that need modifications and improvements (legacy systems). The differentiation of each public authority, depending on the type and the breadth of their applications, is considered. For each authority, new levels of applications should be created after a feasibility study. For the passage to the following levels, all processes from the organizational side should be registered in order to achieve their unification and communication in the whole public authority. At the same time, it should be defined how the applications that are already used by authority's services are suitable to remain operational with small interventions and modifications.

## Level 3: Intranet

The authority's employees via a Web-based environment are able to use their departmental Intranet applications or other departmental applications without having installed them into their personal workstation. Except for the single logon facility (developed in forthcoming level) other functionalities may concern document management, workflow management, employees' calendar and to-do list, online library, telephone list, and so forth.

## Level 4: Automated Protocol

Level 1 automatically provides a protocol number to the applications it is required, without the need of manual use of electronic protocol. This application constitutes the input and output gate of documents and files that the organization manages in total. Its layout will provide the system ability of recording, monitoring, checking and informing the total of internal and external activities that are realized by the persons in charge of receipt and service of citizens, consequently the improvement of working conditions and the upgrade of provided services.

Segregation of the incoming and outgoing documents should be provided. Moreover, a separation of internal and external registrations from the authority's point of view is required for the distribution of documents. The communication among the software functional units should be safely realized with the use of encryption. The possibility of security gradation at the processing performed by the protocol is required and where it is needed, the document in question must be coded respectively.

## Level 5: Unified Identification of Internal Users

This level deals with the study, design and implementation of single sign-on (a common login/password for all applications that require one), which will correspond to one single internal user. Nowadays, at the several applications installed and used at governmental services, each employee/user has a different login/password to be identified as unique by the applications and to be able to access and use them. Within this level, a unique pair of login/password will be assigned to each user, enabling him or her to access all applications used internally in his or her service.

## Level 6: Portal

Level 6 deals with the implementation of a portal addressed to citizens presenting information on the public sector without the need of user authentication. Indicatively, it can contain information, such as announcements, online libraries, links to other e-governmental portals/sites, information searching, help desk, and so forth. Through this level, the government's image to the public seems integrated and not as a collection of different partial pieces. The citizen can be served by visiting a one-stop shop.

## Level 7: Unified Identification of External Users

E-government applications often need unique identification per citizen, and if possible single sign-on for all applications. Level 7 deals with the study, the design and the implementation of single sign-on, which will correspond to one single external user/citizen. This level applies to e-applications, accessed only by the citizen's personal attendance at the specific public department. The applications described at the following section, under the framework of Level 8 are not included at the applications mentioned here.

## Level 8: Portal Upgrade with Applications Adjusted to Every User

The main scope of this level is the portal update and enrichment with applications that demand external users' authentication, which varies from weak to very strong. The scope is the portal to permit several users' categories to access information and services according to the privileges granted to them. The portal's target groups/categories are citizens, businesses, ministries' and other public authorities' employees, organizations' employees, and administrators.

The portal should provide a central point of data accumulation and interconnection with several different applications and systems used by various participants, located in different sites. Therefore, the issue of security and the issue of personal data manipulation are of high priority and importance. For the portal's reliable and efficient operation, the definition of security policy is required. According to this policy, the citizen will use single sign-on to enter the specific location and will be recognized by the system until he logs out. The services provided by the portal relate to all the aforementioned users' categories and indicatively are: information interconnection of Internet sites, information search, retrieval and data submission for further processing, e-mails sending/receiving from public authority, discussion forums, and so forth.

Additionally, the upgraded portal may contain further functional characteristics, such as search engine with sorting capabilities, unified and automated users' support

through multiple communication channels (Web, e-mail), personalization for each user, 24/7 secure and layered functionality, with at least 99,99% availability, and so forth.

## Level 9: Digital Signatures

Digital documents are more vulnerable to alterations or forgeries, opposed to hard-copy documents. To avoid therefore the danger of unwanted modifications, digital signature processes have been developed, supported by cryptographic methods. However, the legalization must be firm, concrete and well established, in order for applications, documents and transactions demanding citizen's signature to be equivalent to their electronic versions digitally signed and sent from the citizen's workstation. A digital signature is not the electronic printing of the handwritten signature, as the term misleadingly implies. It is a "locked" abbreviation of an electronic document. This abbreviation could be characterized as the electronic document's fingerprint. The root of the process to create a digital signature are the cryptographic algorithms, which use different keys for "locking" and "unlocking" an electronic message. It fulfils mainly two functionalities (a) affirmation, as the receiver may be certain that the delivered message belongs to the sender, without any intermediate modifications and (b) confidentiality, as the receiver is assured that he is the only one who will read the message and not any unauthorized people as well. Supplementary cryptographic methods must be implemented to support confidentiality.

## Level 10: Smart Cards

Smart cards compose the most well-known authentication method of the people participating in transactions (Auerbach, 2003). These cards are capable of respecifying the data stored at their memory and can be used in advanced applications. Level 10 constitutes an advanced and secured authentication pattern, taking advantage of the characteristics of smart cards, in order for the citizen to use the portal and includes personal data encryption. At these cards, unique data on their owner are stored, used for their authentication, such as personal ID, as well as data relevant to the advanced applications, facilitating the smart cards' holders' transactions with the government, automating procedures, which in the conventional way are time consuming and demand bureaucracy and long queues at citizens' help desks, and so forth. Depending on each authority's peculiarities, a large number of applications using smart cards came up and can be classified to several layers according to their operational dimension.

## Level 11: Translation

Economic emigration, as well as free movement of persons within countries (e.g., E.U.) is a phenomenon that has abnormally increased recently. Additionally certain countries use more than one official language (Switzerland, Cyprus, Canada, etc.) All the services provided by e-government must fulfill the needs of multilingual citizens and nonnative emigrants, as they are enrolled in other countries' system. Level 11 copes with the adaptation of e-applications to multicultural environments. All the aforementioned functionalities must satisfy multicultural and multilinguistic requirements in order to satisfy all citizens, while searching for a job and transacting with e-governmental services.

## Level 12: Digital Television

Digital television (DTV) has been in development for more than a decade. Level 12's target is the citizen to access the portal via DTV, leading to the ultimate stage of e-government where each citizen (native and nonnative) accesses e-services through his television, in a way similar to zapping through television channels according to his preferences, as television is a communication mean more accessible and familiar to the average citizen.

## Level 13: Satellite Communication

Governmental executives take advantage of satellite signals (GPS) while traveling aboard in order to exchange information and opinions. This advanced stage composes the way of informing the governmental executives on the evolution of national affairs, during their traveling abroad due to their obligations, through satellite signal. Moreover, it provides the capability of sending information to the portal, in order to promptly inform the citizens, as well as of discussing with other executives and the citizens on vital governmental issues.

# FUTURE TRENDS

The transition from the traditional model of governance to the digital one, involves not only technological but also organizational, economic, social, legal and democratic dimensions. In this framework, a number of future challenges and risks have been identified and should be solved from both sides: government (e.g., complexity, poor IT infrastructure, human resources and financial constraints, legal issues) and users (e.g., lack of familiarity and trust, digital gap).

One of the most crucial barriers that e-government should overcome concerns interoperability. This requirement relates to local and regional public administrations, enterprise sector and it also goes beyond the national borders and involves other countries administrations. The interoperability of ICT systems and applications, the sharing and re-use of information and services, the interlinking of various administrative processes, within and between sectors are essential factors for the delivery of high quality, innovative, seamless and customer-centric e-government information and services.

Another point of consideration relates to the e-government requirement that information/services sharing both within and across organizational and administrative boundaries, should comply with personal data protection principles, laws and regulations. Generally involves the following tasks: digital data collection, data storage, data processing, data transfer, and data share. This, in its turn, affects the way e-government architectures will be designed and implemented.

Moreover, several issues related to privacy should be addressed. The future challenges and research in the direction of delivering e-services without jeopardizing– but in fact protecting- privacy relate to: standards support, intelligible disclosure of data, disclosure of methods, provision of organizational and technical means for users to modify their user model entries, user model servers that support a number of anonymization methods, and adapting user modeling methods to privacy preferences and legislation.

Finally, secure interconnection and intercommunication comprises key aspect and does not address only the advances in cryptography and protocols for secure Internet communication (e.g., SSL, S-HTTP). It also encompasses a whole range of policies, legal processes and operational guidelines.

## CONCLUSION

Governments, facilitated by IT and the Internet, promote and support e-government, aiming to more rapid and more efficient citizens' servicing. This attempt is not an easy one, since it demands correct and prompt design, infrastructures' availability at wide-scale and modification of citizens' mentality. Nevertheless, following gradually a series of levels, the transition from the traditional government to e-government may succeed. Existing conventional e-government implementations have subconsciously applied only Levels 4-6.

ICT may contribute essentially to this direction, as long as the state and the citizens adopt them under the framework of a broader reorganization of the public sector. The outcome will be the allowance of the unobstructed information flow from/to the public sector and the offering of the possibility to the citizens, as well as the businesses, to acquire better access to the governmental services.

It is also important to mention that the evaluation of e-government initiatives plays crucial role in their successful application and operation. The provided governmental information and services should be examined using various measures and criteria (e.g., security, privacy, usability, content, services, communication, citizens participations, disability access, multilingualism, and so forth (Bongers, Holland, & Vandeberg, 2003; Holzer & Melitski, 2003).

Finally, some arguments focus on the democratic processes, since it is difficult to ensure that all citizens have access to the necessary IT infrastructure in order to benefit from the available services (Spencer, 2003). Moreover, the use of e-government emerges the need of protection users' privacy and elimination of their personal information misuse (Earp & Baumer 2003; Kobsa & Schreck, 2003). The new technologies and products for protecting user's privacy on computers and networks are becoming increasingly popular. However, none can guarantee secure communications. So, electronic privacy issues in the foreseeable future will become highly crucial and intense.

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## KEY TERMS

**Digital Signature:** A digital code that can be attached to an electronically transmitted message that uniquely identifies the sender. Like a written signature, the purpose of a digital signature is to guarantee that the individual sending the message really is who he or she claims to be. Digital signatures are especially important for e-commerce and e-government and are a key component of most authentication schemes. To be effective, digital signatures must be unforgeable. There are a number of different encryption techniques to guarantee this level of security.

**Digital Television (DTV):** It is a new type of broadcasting technology that will transform current form of television. DTV technology will allow broadcasters to offer television with movie-quality picture and CD-quality sound, along with a variety of other enhancements. DTV technology can also be used to transmit large amounts of other data into the home, which may be accessible by using one's computer or television set.

**E-Government:** This term refers to any government functions or processes that are carried out in digital form over the Internet. Local, state and federal governments essentially set up central Web sites from which the public (both citizens and businesses) can find public information, download government forms and contact government representatives.

**Government to Business (G2B):** The objective of G2B is to reduce burdens on business, provide one-stop access to information and enable digital communication using the language of e-business (XML). Moreover, the government should reuse the data reported appropriately and take advantage of commercial electronic transaction protocols.

**Government to Citizen (G2C):** The goal of G2C is to provide one-stop, online access to information and services to individuals. Citizens should be able to find and access what they need quickly and easily.

**Government to Government (G2G):** The aim of G2G is to enable governments and organizations related to them to more easily work together and to better serve citizens within key lines of business.

**Portal:** A Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and on-line shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by now most of the traditional search engines have transformed themselves into Web portals to attract and keep a larger audience.

**Smart Card:** A small electronic device about the size of a credit card that contains electronic memory and possibly an embedded integrated circuit (IC). Smart cards containing an IC are sometimes called integrated circuit cards (ICCs). To use a smart card, either to pull information from it or add data to it, one needs a smart card reader, a small device into which one inserts the smart card.

# The Lifecycle of Transactional Services

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## INTRODUCTION

Electronic government can be defined as the use of information and communication technologies in government for at least three purposes: providing public services, improving managerial effectiveness, and promoting democracy (Gil-Garcia, 2004). This definition recognizes transactional services (i.e., services that involve filling-in, submission, and processing of electronic forms) as a vital component of e-government, since public service provision and interaction between citizens and government is mainly modeled through such services (eEurope, 2000). It is worth noting that among the 20 public services included in (eEurope, 2000) as "first steps towards 'Electronic Government,'" 18 of them (90%) are transactional services, with the remaining two being informational services (information search and retrieval). Similar ratios hold for electronic services worldwide: for instance, the government of Dubai analyzed *all* services it offers and has concluded that 1,200 of these services are transactional, out of a total of 1,500 services (AmeInfo, 2004) (80%; again, the remaining services are informational). Historically, governments have first implemented informational services (provision of information related to the procedures and regulations related to governmental services), then proceeded with downloadable forms which can be filled-in and submitted manually (one-way interaction), subsequently moved to providing the ability to online submit forms whose data were processed later with human intervention (two-way interaction) and finally reached full electronic case handling (Cap Gemini, 2004).

*Figure 1. Expected benefits for electronic service users*

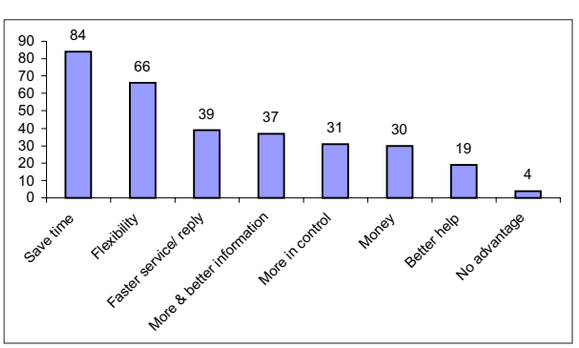



*Table 1. Development of e-Government in the EU*

| | Oct 2001 | Oct 2002 | Oct 2003 |
|---|---|---|---|
| Services fully available online | 20% | 35% | 45% |
| Services available online | 45% | 60% | 67% |

In the past few years, governments are systematically working on realizing e-government policies and frameworks, which include the delivery of transactional services for enterprises and citizens. Citizens and enterprises expect that provision of rich spectrum of transactional services will to result to a number of benefits, as reported in (Top of the Web, 2003) and illustrated in Figure 1.

The progress of these works have been quantified and evaluated in reports; notably, the reports (Cap Gemini, 2003; Cap Gemini, 2004) have targeted the e-government development status in the European Union and have produced results showing the developments and trends in the EU countries. Some interesting findings from these reports are shown in Table 1.

Note that services available online includes services a portion of which has been made available online, and some other portion is still carried out manually; services fully available online are fully processed in an online fashion and have no manual portion. A similar quantification approach is taken by the UN Global E-government Survey (UN, 2003), which identifies five stages of service delivery, namely, emerging presence, enhanced presence, interactive presence, transactional presence and networked presence, with interactive presence and transactional presence being the counterparts of online availability and full online availability (networked presence refers to a government-to-citizen framework based on an integrated network of public agencies for the provision of information, knowledge, and services). In this report, the average service online availability indicator for the top 15 countries is computed to be 63.8%, whereas the average service full online availability indicator is 20.2%[1].

The results of the studies presented above clearly indicate that despite the users' high expectations from transactional services and the governments' will and support for their development, the progress achieved insofar lags behind the desired levels. First, in the time frame of approximately one decade (governmental services have appeared on the Web in the mid-nineties), even the basic online services are not fully covered; moreover, the *growth speed* towards the full coverage is dropping (15% for the period 10/2001 to 10/2002 against a mere 7% for the period 10/2002 to 10/2003). Second, for services that do have a point of presence on the Web, full electronic case handling is provided only for the two thirds of them, while the remaining one third includes (at least one) stage that is performed manually. From the users' point of view, some pessimism can be identified in the issue of *better help*.

## BACKGROUND

The roots of the shortcomings identified in the previous section can be traced back to a number of challenges and particularities that pertain to the management of transactional services:

1. The domain knowledge needed for development of electronic service is highly complex (e.g., administrative legislation, tax regulations) and in many cases it is possessed by domain experts employed in the pertinent organizations in the form of *tacit knowledge* (Lam, 2000), which cannot be easily communicated to systems analysts that traditionally extract and catalogue the requirements for software systems.
2. The legislation and regulations governing the electronic services are volatile and subject to frequent changes. Such changes impact portions of the electronic services, which must be rapidly identified and adapted to meet the new regulations. Once components are adapted, the service should be redeployed.
3. The front-end accessed by citizens should be connected to the organization's back-office system, in order to provide fully automated services (Jupp, 2001).
4. The task force that is involved in service development is quite large and with diverse skills. This task force will consist (at a minimal basis) of domain experts, systems analysts and developers, user interface experts (necessary because the electronic service is targeted to people with little computer experience), HTML coders and security specialists (citizens and enterprises will be reluctant to use a service if they are not sure that their data will be safe (Vassilakis, Lepouras, Fraser, Haston, & Georgiadis, 2005). Cooperation and coordination in such a group is inherently difficult, not only because of the large number of the members, but also because of the different "languages" spoken by its members.
5. The users of the transactional services do not generally possess a high level of domain knowledge regarding the legislation and requirements of the business process that the services model. It is thus imperative that extensive help (explanatory texts, examples, and FAQs) is provided, especially for complex transactional services (e.g., tax return forms). It is worth noting that such "help items" are generally produced in the phases of user requirement analysis (while domain experts explain to system analysts the tasks that the software has to carry out), but they remain recorded as internal project documentation, rather that being made available to users for reference.

Note, that some of these challenges (especially 3-5) may apply in other contexts of transactional services (e.g., business-to-citizen services [including e-commerce]) or business-to-business services. In these contexts, however, the situation may be less complicated due to a number of reasons: for example, in e-commerce the required domain knowledge is much simpler, while in business-to-business services the users are usually trained personnel. In this work, we will limit our discussion to e-government transactional services, which appear to be the most demanding case.

Currently, transactional services are handled as "typical" software artifacts and are developed and managed using traditional software engineering paradigms, including the spiral model (Boehm, 1988), the waterfall model (Schach, 1999) and the rational unified process (Kruchten, 2000). All these paradigms include a user requirements analysis phase followed by software design, development and testing/evaluation before the final deployment. Different methodologies allow for iterative execution of various phases, for the purposes of modifications or refinement due to feedback from subsequent phases.

For the phases of development and deployment, in particular, a number of products have emerged in the past few years, showing that the software industry recognizes both the potential of the transactional services and the challenges related to their lifecycle. Commercial products include Adobe Acrobat e-forms (Adobe, 2004), PureXML E-Form (PureEdge, 2004) and Oracle E-Business Suite 11i™ (Oracle Corporation, 2004). These tools are however mainly addressed to personnel with IT expertise, and their main task is to relieve IT personnel from the burden of writing "routine" code that handles the interaction be-

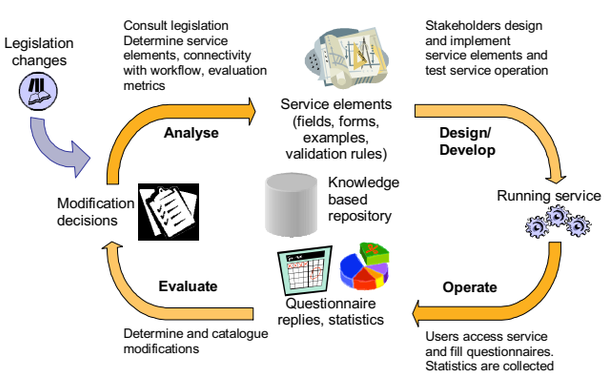
tween the user's browser and the Web server delivering the service. Although this is a significant aid to IT personnel, these tools cannot be used to tackle the issues identified above.

In the standards realm, the W3 consortium has published the XForms specification (W3 Consortium, 2002), which standardizes the specification of Web forms. A major contribution of the XForms standard is the separation of content, structure and user, which are modeled as form purpose, form presentation, and form data, respectively; however, browsers have not insofar incorporated support for XForm documents. Thus their usage remains limited.

## TRANSACTIONAL SERVICE LIFECYCLE

In order to alleviate the challenges identified in the previous section, a *transactional services development environment* has been designed and implemented, which supports all the phases of transactional services lifecycle, which are depicted in Figure 2[2]. Using this development environment, domain experts can directly input their knowledge regarding the transaction service (stemming directly from the analysis phase or pre-existing as individual tacit knowledge). This knowledge is codified into concepts of high levels of abstraction, such as fields, forms, or services, which are familiar to all stakeholders. Domain experts also attach to these concepts examples and documentation (usually expressing tacit knowledge) that will directly be used as help for end-users, and define *validation rules* (i.e., restrictions on the field values in the submitted documents) usually stemming from the related legislation. When documents are submitted through the transactional service, the field values should be checked to determine whether all validation rules are satisfied; if some of them are not met, the service user should be prompted to alter the values entered. Finally, domain experts attach *legal information* to the concepts, usually consisting of laws, directives, and regulations, which govern the operation of the service.

*Figure 2. Supporting the lifecycle of the transactional service*




Managers are a second stakeholder group that uses the development environment to define metrics and procedures for facilitating service evaluation. In particular, managers may define online questionnaires for service assessment by its users as well as statistics regarding the service usage (number of submitted documents, number of validation rule violations, time taken to fill in documents or document pages, etc.). Statistics may also be collected at a more fine-grain level (e.g., error rates of specific validation checks) percent of document submissions using specific fields and so forth.

IT staff is the final stakeholder group using the platform in the design and development phase. IT staff complements the information provided by domain experts with elements that are necessary for the operation of the electronic service. For example, users of transactional services should generally authenticate themselves by providing a user name and a password, which should be checked against some repository. Additionally, documents submitted by the users of the transactional service should be entered in the workflow of the service provider, in order to be processed and formulate the replies that will be returned to the service users. These are typical tasks that require IT expertise in the context of a transactional service. IT expertise may also be required in the design and implementation of the user interaction (HTML forms, active behavior [informational messages and alerts, automatic calculation of sums], etc.). IT staff finally may define statistics for technical aspects of service operations (e.g., form download speeds, CPU time needed for various tasks), which can help them fine-tune the service content and/or the platform delivering the service.

The information entered by all stakeholders is stored in an organization-wide knowledge repository (Figure 2). Such a repository is a valuable asset for organizations, since it promotes information sharing and reusability. For example, legislation regarding the authentication requirements for electronic services needs to be entered only once in the platform and will be readily available for all electronic services to use, while examples created by a domain expert for a service after a thorough study of the related legislation will be accessible by other domain experts that only need the "digested" information, without the need to go through the legal documents anew.

Once all elements for a transactional service have been defined, service deployment may commence. Service deployment is realized through a generative programming (Czarnecki & Eisenecker, 2000) engine included

in the SmartGov platform, the *Integrator*. The Integrator extracts from the knowledge-based repository the elements of the transactional service and translates them into a collection of files containing the visual (HTML forms) and the business logic (validation checks, data storage/retrieval, etc.) portions of the service; these files may be directly used for delivering the service to the public. For example, for each form of a service, the Integrator creates an HTML page containing an appropriate input widget for every form field. Moreover, validation checks that have been entered by domain experts in a high level of abstraction (e.g., "field *Gross Income* should be greater than field *Net Income*") are translated to code that implements these validation checks (e.g., *if (documentField["GrossIncome"].value<=documentField["NetIncome"].value) errorMessage("Gross Income should be greater than Net Income")*).

After its deployment, the service is put in its operational phase, with users accessing the service and submitting documents. Throughout the operational phase, the statistics defined in the design/development phase are collected and stored into the knowledge-based repository. Each statistical value is correlated with the concept it applies to, for example, the time needed to download a form is associated with the specific form, while the number of violations of a validation rule is linked with the particular validation rule (which is in turn linked with the fields it involves). This correlation facilitates the evaluation phase, since it is eases the task of locating service components for which specific statistics exceed a specific threshold or drop below it, giving thus indications that amendments are needed. For example, if the number of violations of a specific validation check is excessively high, more thorough documentation and examples may be provided; if users complain about the form readability (a metric that can be collected through online questionnaires), HTML forms can employ bigger font sizes; if portions of the service take long to execute, IT specialists may perform some optimization. The output from the evaluation phase is directed to the analysis phase, although in certain situations the design/implementation phase can commence immediately, skipping the analysis phase (e.g., a change in the font size only affects the implementation).

Another source of requirements for modification stems from changes in the legislation and regulations governing the electronic services. In such events, the linkage between legal information, entered by domain experts in the design/development phase, and service elements is exploited to locate elements that are affected by the legislation changes. Once the elements have been identified, the necessary maintenance activities can be undertaken; these activities may span across the analysis and the design/development phase, if revisions are major, or be limited to the design/development phase only. Naturally, the legal information should be updated as well, to reflect the current status.

The use of the platform has been evaluated by stakeholders that have participated both in the development and the usage of transactional services and the results are documented (SmartGov consortium, 2004b). The quantitative measurements have demonstrated that various aspects of transactional service lifecycle management improve through the use of the platform, including, for example, reduction of development and deployment time, improved services to the citizens, reduction of development/maintenance costs, etc. Moreover, the transactional service stakeholders have shown a very positive attitude against the platform, not only as regards to the platform usability and efficiency, but stating that the introduction of the platform constitutes an improvement to their working conditions as well, since they are promoted from mere information providers to active developers. This promotion additionally eliminates the shift of power barrier identified in (Vassilakis et al., 2005), according to which domain experts refrain from giving away their tacit knowledge for fear of losing the power and status associated with it; stakeholders are now accredited for the knowledge they offer, thus their status improved.

## FUTURE TRENDS

Most of the work, in the context of e-government services, has focused on the development of individual informational and transactional services, with various levels of sophistication. A natural next step in this area will be the promotion of service integration and interoperation, for providing added value to consumers of services, such as the handling of *life events* (Wimmer & Tambouris, 2002). Since the services involved in life events usually span across multiple governmental agencies, technical, methodological, and organizational barriers for such interoperations should be addressed. Holistic frameworks for electronic government, encompassing not only the provision of transactional services, but also the aspects of democracy promotion and managerial effectiveness (Gil-Garcia, 2004) will be also of essence.

## CONCLUSION

Transactional services are an indispensable component of electronic governance, since they are the primary means for delivering online public services. Administrations have made considerable progress insofar, but the inherent complexity and the special requirements in the

management of the transactional services' lifecycle are not satisfactorily addressed by current practices, leading in sub-optimal results in these efforts. This article has identified the critical issues in the lifecycle of the transactional services and has proposed a development environment and associated tools that can support organizations in the management of transactional services. With such tools, organizations can more effectively manage existing services and speed up the development and deployment of new services, bringing the vision of e-government closer.

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## KEY TERMS

**Form Field:** In the context of transactional services, the electronic counterpart of areas that users fill in data (e.g., name, address, birth date, total income, etc.). A form field typically has a *label*, describing the data that the user is called to fill in and a *data type*, dictating the set of values that are allowed to be entered (numbers, dates, strings, etc.). Some fields may be "closed," (i.e., allow the user to choose a value from a list), whereas other fields may be *read-only* and not allow their value to be changed.

**Form Field Group:** A collection of individual form fields that model a compound concept. For instance, the fields "street name," "number," "zip code," and "country" can be combined to the form field group "address." The counterpart in a paper-based environment is specific areas on document forms.

**Informational Services:** Electronic services that provide information related to the procedures and regulations for transactions with the government. The services *per se* are not necessarily provided electronically.

**One-Way Interaction Services:** Electronic services that allow the downloading of electronic forms for the purpose of printing and manual submission.

**Transactional Services:** Electronic services that implement a complete transaction between the service user (citizen or enterprise) and the service provider (government). Typically, such services include submission of data by the service user, processing by the service provider and return of a reply (results of processing) to the user.

**Transactional Service Stakeholder:** A person playing a role in the development, deployment and operation of a transactional service. Typical stakeholders are managers (deciding which transactional services should be implemented and evaluating the operating transactional services), domain experts (who possess the domain knowledge for the modeling of transactional services), IT experts (who provide the technical know-how for the implementation) and end-users of the service.

**Two-Way Interaction Services:** Electronic services that allow the downloading of electronic forms, online filling, and submission of data. Processing of data and return of replies is performed in an off-line fashion by the organizational back-end.

**Validation Rule:** A business rule applying to the values entered in the form fields of a transactional service, and must be satisfied by all submitted documents. Typical examples of validation rules are "entering a value in field A is mandatory," "the value of field A should be in some specific range," "field A should be greater than field B," and "if field A is filled in, field B must/must not be filled in." More complex validation checks may also appear.

## ENDNOTES

1 The indicators in the UN survey appear smaller because (a) they consider a wider range of services and (b) they pertain to the period April-May 2003, giving a 6-month handicap to the Cap Gemini measurements.

2 This work has been performed in the context of the SmartGov project (Georgiadis et al., 2002; SmartGov Consortium, 2004a), co-funded by the IST framework.

# Maintaining Information Security in E-Government through Steganology

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## INTRODUCTION

Traditional government structures are sometimes regarded as overly bulky. However, with the rapid expansion of interconnected computer networks and the progressive development of information technology (IT), it is now possible to exchange massive amounts of data at light speed over great distances. These infrastructures and technologies provide the opportunity for governments to transform themselves from huge monsters to compact and efficient organizations. Realizing the potential benefits of IT, as of summer 2004, 198 governments had started their e-government plans to construct digital government based on the Internet (West, 2004).

One of the essential features of e-government is the transmission of confidential information via computer networks. Depending on the sensitivity of the information, the security of some information should be treated at the same level as national security. Although each e-government has its own networks, no government can say no to the Internet, because it would be a waste of resource. However, the Internet is an open environment; therefore, protecting data flowing on the Internet from attacks is a pressing e-government issue.

All governments with such strategies have sought help from cryptographers and devoted huge amounts of both money and time to the development of specially designed information systems and advanced cryptosystems to strengthen information security. Unfortunately, cryptography is not adequate in some applications. As computing power keeps increasing and the techniques of cryptanalysis keep advancing, contemporary cryptosystems cannot and will not work forever. At the 24th Annual International Cryptology Conference (CRYPTO'04), MD5 and a series of related cryptosystems, which are currently in widespread use, were proved unreliable (Wang, Feng, Lai, & Yu, 2004).

From the last decade, *steganology*—the technique for digitally hiding and detecting information – is attracting more attention. It is already regarded as a powerful complement to cryptology and a promising technique for ensuring e-national security. Unlike cryptology, which renders the encrypted information completely meaningless, steganology keeps the host media perceptually unchanged after hiding the secret information. This article will provide an in-depth explanation of the two components of steganology, namely *steganography* and *steganalysis*, and discuss their potential applications in the realm of e-national security.

## STEGANOGRAPHY

Markus Kahn (1995) defined steganography as "the art and science of communicating in a way which hides the existence of the communication. In contrast to cryptography, where the enemy is allowed to detect, intercept and modify messages without being able to violate certain security premises guaranteed by a cryptosystem, the goal of steganography is to hide messages inside other innocent messages in a way that does not allow any enemy to even detect that there is a second message present." This definition has been widely accepted within the information security community.

The application of steganography can be traced back to ancient times. In 499 B.C., Histiaus shaved the head of his most trusted slave and tattooed an important message on his scalp. When the slave's hair grew back, the information was concealed and the slave was sent to Aristagoras, who then shaved the slave's head again to reveal the message, which instructed him to revolt against the Persians (Herodotus, 1992). That probably is the oldest instance of steganography. As the technique improved, invisible ink and microfilm emerged in modern applications. The watermark on bank notes is the most common contemporary instance of steganography.

In the modern world, steganography is a covert communication technology that allows secret information to be hidden in *cover message*/media. The resulting message with the hidden information is called the *stego message*.

Steganographic techniques can be divided into two broad categories: *digital watermarking* and *digital fingerprinting*. Digital watermarking focuses on the embedding algorithms and is used for purposes of copyright protection, authentication and integrity verification. The hidden information, namely, the *watermark*, in digital watermarking is relatively simple, normally the digital signature of the owner or a random pattern generated with a secret key. Digital fingerprinting concentrates on the method (sometimes referred to as protocol) of generating the hidden information, namely, the *fingerprint*, so as to meet requirements such as uniqueness and counterfeit-proofness. Fingerprinting techniques always utilize watermarking techniques to embed the generated fingerprint. In other words, the essential difference between these two categories is that the fingerprint embedded by fingerprinting techniques is unique for every single copy of the cover message, while the watermark used by watermarking techniques is always the same for all copies of the cover message and is related to the cover message and its owner. Different schemes of these two categories also have other special features to meet the specific needs of their applications.

Some other common properties of steganography techniques are as follows:

- **Transparency:** The distortion introduced by the embedding process should be imperceptible to humans so that the impact on the perceptual quality is minimized.
- **Robustness:** For most applications, such as copyright protection, survivability against all kinds of malicious attacks and incidental manipulations, such as lossy compression and format trans-coding, should be maintained unless the manipulations have rendered the content useless in some sense.
- **Payload:** Payload (i.e., the embedding capacity) is important for digital fingerprinting. Since the function of the fingerprint is to identify the individual recipient/buyer, the fingerprint should be long enough to provide space to keep the uniqueness when a huge number of copies of the cover message are to be distributed. In this case, embedding capacity is the deterministic factor of an effective fingerprinting scheme (Su, Eggers & Girod, 2000).

## Digital Watermarking

The idea of digital watermarking is to embed a small amount of secret information—the watermark—into the host media to achieve goals like copyright assertion, authentication and content integrity verification, and so forth. The superiority of digital watermarking over cryptography is that the latter provides no protection after the content is decrypted, while the former provides "intimate" protection at all times, because the watermark has become an inseparable constituent part of the host media. All the capabilities of a watermarking scheme, including the balance between the transparency and robustness to avoid any perceptible artefacts and the other properties to meet its special application, are dependent on the design of the embedding algorithm. To optimize performance, the embedding algorithm is always specially designed for a certain type of media, such as image, video, audio and so forth, to avoid any possible security gap. Digital watermarking schemes can be classified into three categories: *robust watermarking*, *semi-fragile watermarking* and *fragile watermarking*.

Robust watermarking is intended for the applications of copyright protection and digital rights management (DRM), wherein the watermark containing copyright information should be detectable after attacks that aim at erasing the watermark but maintaining the value of the host media. Cox, Kilian, Leighton, and Shamoon (1997) proposed the concept of spread-spectrum (SS) watermarking, which has inspired a great number of recent works in this field. Adopted from communication theory, the idea of SS watermarking is to treat the low-energy watermark as a narrow-band signal and spread it into multiple components in the spectrum of the host media, which is treated as a wide-band signal. By spreading the watermark in the spectrum, the energy of the watermark in a signal frequency is limited, and thus the robustness is guaranteed even when some frequency components are missing. However, the high robustness of SS watermarking is gained at the expense of low payload, so it is not quite suitable to the purpose of digital fingerprinting. To further improve the robustness without causing more artefacts, human perceptual models (HPM), including human visual system (HVS) and human auditory system (HAS), have been proposed and incorporated in the watermark embedding process (Barni, Bartolini & Piva, 2001). Feasible perceptual models facilitate adaptive watermark embedding in components where HPM is less sensitive.

Semi-fragile and fragile watermarking have been developed for the purposes of authentication and content integrity verification, in which the embedded watermark is expected to be destroyed when the attacks are mounted, so that the alarm will be raised by the detector when it fails to extract the watermark. The difference between these two sub-categories is that semi-fragile watermarking regards some designer-specified operations as non-malicious actions while fragile watermarking treats all kinds of manipulations as malicious. Counterfeit-proofness is a key objective (semi-) fragile watermarking schemes are expected to achieve. Counterfeiting attacks, such as cut-

and-paste, vector quantization attack and transplantation attack, are about replacing regions/segments in the watermarked media with fake patches/segments. This problem can be solved through correlating adjacent regions/segments of the media during the embedding process so that neighbors of the replaced regions/segments will raise the alarm in the verification process when the original regions are missing. Methods of establishing neighborhood dependency/correlation can be found in Li and Yang (2003) and Si and Li (2004).

While there are many watermarking schemes for images, audio and video, schemes for text are relatively scarce. Unfortunately, text is the dominating type of data in e-governments. Some published schemes, such as those developed by Huang and Yan (2001), focus on modifying the formations of the digital documents, such as font size, line spacing and layout. These modifications are imperceptible to human eyes but can still be detected by the decoder even after being printed and photocopied several times. However, this type of scheme depends on the formations of the documents so much that re-typing the text is always an effective, albeit awkward, attack. Attackers with an optical character recognition (OCR) system, which scans and digitizes printed documents, will find that defeating the security of watermarked textual documents is a trivial task. Much more effort needs to be expended, therefore, to increase levels of security in this area.

## Digital Fingerprinting

A digital fingerprint is a unique pattern/message to be embedded in the host media for identifying the recipient. Digital fingerprinting cannot resist illegal copying, but it enables the copyright owners or media distributors to trace the recipients who leak or redistribute the fingerprinted media.

This section begins with a discussion of some of the terms used in the description of fingerprinting (Boneh & Shaw, 1998). A *mark* is a position in the host media, which can take one of $k$ values, and a *fingerprint* is a collection of $l$ marks. Therefore, a total of $k \cdot l$ fingerprinted copies of the host media can be produced. A *distributor* provides legal copies with different fingerprints to the *users*, and a *traitor* is a user who illegally redistributes his or her fingerprinted copy to potential *attacker*($s$). The main vulnerability of digital fingerprinting schemes is the possibility of a *collusion* attack, in which a sufficiently large number of the fingerprinted copies are collected to detect some marks that differ in more than one of the collected copies. Based on those detected marks, the strength of fingerprints can be attenuated by averaging the values of the marks so as to create a new copy that carries no trace of the colluders' identities. Therefore, an additional requirement for digital fingerprinting is anti-collusion, which means that even after the attackers have gathered a sufficient number of legal copies, they still cannot detect and attenuate the fingerprints. More technical details about this process can be found in Trappe (2003) and Celik, Sharma, and Tekalp (2004).

Digital fingerprinting is applicable in the areas of *traitor tracing* and *anonymity protection*. The idea of traitor tracing is quite straightforward (Chor, Fiat, Naor, & Pinkas, 2000). Confidential data are secured with access control and anyone who has the right to access the data must have his or her identity or password known to the central system. The central system could generate the fingerprint according to this identity and embed the fingerprint into the copy before encrypting the data and allowing the fingerprinted data to be retrieved or sent via the networks. Should the fingerprinted data be leaked, the traitor could be traced by checking the fingerprint. Another extended application of this idea is document distribution tracing. As we know, sending a sensitive document through a channel to the destination/recipient should follow a process of recording and monitoring. To prevent forged documents being distributed through the channel, every unit/node in the channel should embed its fingerprint on the passing document, and the next unit verifies all the fingerprints that the document should carry. If all are present, this document is deemed authenticated; if not, it is forged and the source can be traced back based on the present fingerprints. Given the fact that embedding capacity is limited, the problem of the above idea is that when too many fingerprints are embedded into one media, the response of every fingerprint at the detector may be reduced below the threshold so that they cannot be recognized. Another problem is in distinguishing the embedding sequence of the fingerprints. Ongoing research is expected to perfect this application, however.

Voting is an important vehicle for ascertaining public opinion. Concerns surrounding the efficiency, accuracy and justice of traditional elections based on paper ballots have always existed. To overcome those problems, electronic voting systems have been undergoing development for some years. However, the potential impact of security breaches of electronic voting systems is far greater than with traditional voting systems. The use of fingerprinting could be of considerable significance in mitigating these concerns, however. A case similar to electronic voting is anonymous reporting, which helps governments fight against corruption and crime. The shared property of these two cases is that people do not want to reveal their identities and the government has to ensure that the anonymous action is trustable and non-malicious. Pfitzmann and Waidner (1997) introduced the idea of *anonymous fingerprinting*. A third party, namely, a *registration center*, informs the government of its

signature, and the anonym has to register with this center in a *registration protocol* in which he or she must prove his or her identity and get a certificate from the center. This certificate is registered in the center but contains no publicly derivable information about the holder. During the voting or reporting, the anonym and the government interact in a multiparty protocol: The anonym has to present his or her certificate signed by the center and gets a fingerprinted receipt; the government generates the fingerprint from the anonym's certificate and keeps the fingerprint as proof, but in fact knows nothing about the real identity of the anonym. If further verification is needed, however, the government could extract the certificate from the fingerprint and show it to the registration center as proof of the corresponding identity. More advanced anonymous techniques can be found in Pfitzmann and Sadeghi (2000) and Choi, Sakurai, and Park (2003).

## STEGANALYSIS

Functioning like the traditional government, an e-government also has the responsibility of monitoring public data flow. Currently, most governments believe that limiting the strength of public cryptosystems or banning them completely is adequate to ensure national security. For instance, the United States (U.S.) government restricted Microsoft Co. to selling their Internet Explorer software with the highest encryption levels (128-bit) before relaxing export controls in 2000. Another example is that PGP, a successful cryptosystem, was also banned by the US government at one time. From the point of view of a government, this may be a reasonable step to take as far as national security is concerned. However, it leaves the majority of Internet users exposed to privacy breaches. This situation drives the public to resort to steganography for their privacy protection. Because steganography works in such an imperceptible way, governments will have to face many difficulties in detecting covert communications. The consequence of failing to detect covert communications among international terrorists, for example, could be disastrous. So *steganalysis*, the opposite of steganography, may be even more important than steganography from the perspective of e-national security.

Steganalysis is the art and science of detecting or interfering with covert communications, which exploit steganographic techniques. Steganalysis includes three stages: seeking suspicious features, extracting the hidden message and destroying the message. While developing steganalysis algorithms for a specific steganographic scheme is possible, there is no systematic theory or general steganalysis technique available yet. See Chandramouli (2003) and Chandramouli and Subbalakshmi (2004) for the latest information about steganalysis.

## CONCLUSION

We have discussed the properties, roles and applications of steganology in e-national security in this article. Currently, the lack of attention being paid to steganology, especially steganalysis, by governments is a serious problem. This has dangerous implications in terms of both traditional national security and e-national security. While the benefits of steganography should be fully exploited, malicious uses of steganography should also be tackled through steganalysis. Compared to the rapid development of steganography, the slow progress of steganalysis is unsatisfactory, and therefore, more government support is necessary. Cryptology and steganology together function to protect different facets of a nation's security. Integrating the two disciplines is certainly a significant step toward better security against unwanted operations and higher privacy protection in our complex and ever-changing world.

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## KEY TERMS

**Collusion Attack:** A coalitional act of removing digital fingerprints. It is based on the idea that both the position and content of the fingerprint embedded in every fingerprinted legal copy are different. If attackers obtain a large enough number of legal copies, they can garner sufficient knowledge about the positions of the fingerprints by comparing all the copies such that they could then arbitrarily modify the information on the positions so as to fool a fingerprint detector.

**Digital Fingerprinting:** The techniques of generating a unique fingerprint for each copy of a host media and embedding the fingerprint into a copy using the robust watermarking techniques. Because of the uniqueness of the fingerprint, digital fingerprinting can be used for tracing and identifying copyright pirates.

**Digital Watermarking:** A method of embedding secret information (watermark) into host media for the purposes of copyright protection, authentication, content integrity verification and so forth.

**Fragile Watermarking:** A category of digital watermarking that requires the embedded watermark to be un-extractable after any manipulation on the watermarked media. It is widely used in the applications of authentication and content integrity verification.

**Robust Watermarking:** A category of digital watermarking that requires the embedded watermark to be robust enough to survive any manipulations, malicious or not. Because of its robustness, digital watermarking schemes are widely used in the applications of DRM and Intellectual Property Protection (IPP).

**Steganalysis:** The art and science of detecting or interfering with covert communications, which exploit steganographic techniques.

**Steganography:** The techniques and theories of hiding secret information in host media without introducing perceptible distortion.

**Steganology:** The theories and techniques for information hiding. Steganology encompasses two opposite components—steganography and steganalysis.

# Managing Information Exchange in E–Government Initiatives



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## INTRODUCTION

In the literature on e-government, the focus is predominantly on the organization of the front office and on the interaction among governmental agencies and citizens (Chadwick & May, 2003; Edmiston, 2003; Tat-Kei Ho, 2002). However, in order for e-government initiatives to be successful, back-office streamlining also has to be taken care of (Bekkers & Homburg, 2005; Homburg, 2005a). In a sense, back-office operations are the backbone of any form of e-government, and they may require information exchange and knowledge sharing among various units, departments, or organizations.

The e-government phenomenon occasionally has paved the way for stirring rhetoric of technological and institutional change. For example, Wimmer, Traunmüller, and Lenk (2001) predict that "organizational boundaries will fade and give way to innovative organizational design. In this way, cooperation between administrative agencies will span wide: over distances, across organizational boundaries and even across hierarchical echelons" (p. 1).

Actual e-government applications, however, show that the practice of e-government may not be as attractive as some of its benevolent proponents might claim. Back offices can be regarded as networks of organizations in which goals necessarily do not overlap and in which interests may collide. In practice, in these networks, information is the primary medium of value and exchange (Davenport, Eccles, & Prusak, 1992), and relatively uncontrolled sharing of such a powerful resource threatens information monopolies and may provide those organizations who receive information with significant power gains (Bekkers, 1998; Homburg, 1999, 2001; Homburg & Bekkers, 2002; Markus, 1983). Consequently, existing dependencies in organizational networks might be affected, and it can be expected that the exchange of information in back offices invokes a complex mixture of cooperation and conflict (Cunningham & Tynan, 1993; Homburg, 1999, 2001; Homburg & Bekkers, 2002; Knights & Murray, 1992; Kumar & van Dissel, 1996).

In this article, I address the following research question: What does the nature and dynamics of interorganizational relations mean for the development and implementation of e-government information systems, and what methods and strategies are used to design and implement these systems? The focus in the analysis is on the interorganizational relations that are mobilized through the integration of various back-office systems (Bekkers & Homburg, 2005; Homburg & Bekkers, 2002). In the remainder of this article, I analyze existing e-government initiatives and, more specifically, information relations among various back offices, using a political economy view on information exchange (Homburg, 1999), and I explore methods and strategies of ICT process management in policy networks (de Bruijn, ten Heuvelhof, & In 't Veld, 2002).

## BACKGROUND

Many policy processes are fragmented over several administrative organizations. In practice, e-government requires information exchange and organizational redesign in the back office. From a strictly instrumental point of view, the information relations among various organizations can be modeled in terms of secure XML document containers (Greunz, Haes, Schopp, & Stanoevska, 2001) or, in terms of conversation rules, conversation classes and continuation rules using speech act theory (Heesen, Homburg, & Offereins, 1997).

At an institutional level, however, other sets of questions arise. These questions are related to the complex mixture of cooperation and conflict that emerges when organizations start exchanging information across traditional organizational borders (Bekkers & Homburg, 2005; Homburg, 1999, 2001; Knights & Murray, 1992; Kubicek, 1995; Kumar & van Dissel, 1996). In order to illustrate some of these questions, I present some anecdotal evidence of difficulties that arise when organizations exchange information across organizational boundaries. Since these difficulties are not typical for the public sector, I present anecdotal evidence from governmental organizations as well as from private sector organizations.

A private sector illustration is the TransLease information system, a system used by 1,000 British repair agents working for vehicle leasing and contract hire companies (Allen, Colligan, Finnie, & Kern, 2000).

TransLease uses standardized data formats throughout the network (which also enshrine the rules of trade) as the backbone of the system. In practice, actual use of the system proved to be far below expectations. An evaluation showed that the TransLease system did not provide the envisaged mutual benefits to its participants. "A dominant theme for repair agent complaints was their perception of an 'unfair' balance of power, which meant they felt that lease companies would tie them into a system that would reinforce and amplify existing power structures" (Allen et al., 2000, p. 10).

A public sector illustration is the Criminal Justice System in the United Kingdom (Bellamy, 1998). The UK has heavily decentralized and compartmentalized criminal justice agencies, including, for instance, the police, the probation service, and the courts. Early work on automated support centered on an elaborate dataflow model that showed the benefits of a new information system. It was soon clear, however, that the costs and benefits were divided unevenly among the parties involved and that the specific cultures and professional norms of the various agencies were not reflected in operational methods and information management priorities. Therefore, a more piecemeal, incremental approach was chosen, in which various professional groups (lawyers, police officers, probation officers, and prison officers) were allowed idiosyncratic discourses embedded in distinctive data definitions and standards, yet these distinctive domains were very selectively connected using EDI interfaces and e-mail links[1].

The TransLease and CJS cases are, to a certain degree, modest examples of problematic initiatives concerning information exchange among organizations. Obviously, in these kinds of situations, more than mere exchange of information is at stake. Beyond a rather neutral, technocratic account of the development of the information systems in the previously mentioned cases, information exchange takes place in political economies (Homburg, 2005b); with the exchange of information, dependencies among organizations are affected, positions are challenged by ICTs, and partly unintended and very fundamental questions about accountability are raised within the network of cooperating organizations. In this context, it is not uncommon for politicking, hoarding of information, or sometimes even downright sabotage to occur (Homburg, 2005b). Therefore, managing information exchange in political economies requires specific management strategies and tactics, which are analyzed in the subsequent section.

## INFORMATION MANAGEMENT IN POLITICAL ECONOMIES

### Analysis: Case Studies of Interorganizational Information Systems

In this section, the following two case studies of the development of interorganizational, back-office information systems are presented: the development of the Dutch Municipal Register of Citizens' Residential Data and the development of the Dutch Vehicle Registration. The analyses presented here are based on secondary analyses of evaluation reports of the two systems and on interviews and observations.

#### Case 1: Dutch Municipal Register of Citizens' Residential Data (GBA)

The Dutch Municipal Register of Citizens' Residential Data (GBA: *Gemeentelijke Basis Administrati*e) is an authentic registration in which name, address, date of birth, sex, nationality, and so forth of residents in The Netherlands are recorded. Since the 1970s, there has been a lot of discussion on the question of what an authentic registration of residential data should look like. Initially, the discussions revolved around the idea of a centralized register. However, a centralized architecture of such an information system raised fundamental issues concerning the protection of privacy and, moreover, concerning the institutionalized relationships among various levels of government (i.e., the central level and the local, municipal level). In 1984, a decentralized initiative—GBA—a was launched. The discussion on GBA involved the municipalities, which, at that time, owned paper-based registers: the Netherlands Association of Municipalities (the municipalities' interest association), the Ministry of the Interior, and a Project Bureau (established in 1989). The Project Bureau's original task was to develop, among other things, standardized applications on behalf of the ministry. Gradually, the idea of a decentralized register took shape. The register was to be used and partly administered by more than 500 municipalities, while the data were to be used by more than 300 public and private organizations. In the decision-making processes, with respect to the development of GBA, it became clear that various conflicts of interests existed with respect to the envisaged control over (or ownership of) the system. These conflicts existed with respect to the following domains:

- the control over and ownership of the GBA computer systems;

- the control over and ownership of the network connecting the separate systems;
- the control over and ownership of the data embodied in the system;
- the legal framework in which the aforementioned ownership and control issues were formalized;
- the division of costs and benefits over the parties involved.

In fact, it is possible to discern various arenas in the decision making with respect to GBA. An example of such an arena is the decision making with respect to the ownership and control over applications (system level). Originally, it was the task of the Project Bureau to develop applications. The municipalities, however, thought that this would jeopardize their autonomy, and they at least wanted to be able to select a system supplier by themselves.

Various elements of a political economy are present in the decision making with respect to GBA; over time, there had been disputes with respect to the question of whether there should be a centralized system or a decentralized system, and after the decision had been made to implement a decentralized system, there were more or less constant quarrels over control and ownership issues with respect to several aspects of the system. As a result, the composition of project teams changed as individual members left these groups and others joined them.

Eventually, in the process of waxing and waning, a solution was found by granting municipalities control and ownership over the data (municipalities were responsible for the acquisition, maintenance, and dispersion of data), whereas central government was responsible for the system level (i.e., development of a data model, on the basis of which eventually 15 system suppliers developed applications). Furthermore, the development of the legal framework took place in parallel with the development of the system itself.

## Case 2: Dutch Vehicle Registration (NKR)

The second case concerns the development of the vehicle registration (NKR: *Nieuwe Kenteken Registratie*). The registration was initiated in 1981 and eventually put to use in 1995. The goal of the registration was to identify owners of licensed vehicles and vessels. Uses are to be found in the fields of taxation, liability, criminal prosecution, traffic safety projects, and environmental policy. Because of this wide variety of uses, many of the following parties were involved in the development of the register: the Ministries of the Interior, Economic Affairs, Finance, Justice and Transport, Public Works, and Water Management. Furthermore, the Dutch Center for Vehicle Technology and Information and the Central Traffic Police Commission also were involved. Apart from these institutions, representatives from the automotive industry (i.e., auto repair agents) and post office branches were consulted.

The development of the register was carried out by a project organization and not only involved the development of the system in a technical sense but also required several changes in legislation. The intended system owner was the Center for Vehicle Technology and Information. As a consequence, this organization transformed from a relatively technically oriented expertise center to an information service provider for many governmental organizations, which, in this specific case, also involved the transfer of various tasks to this organization.

Many discussions took place in the project organization; as a result, the project organization's composition changed repeatedly. At the same time, a new piece of legislation (WVW: *Wegenverkeerswet*, Act on Roads and Traffic) took place, which affected the functional requirements of the register. In reconstructing the decision-making process, it is striking that, as happened in the GBA case, three arenas could be discerned: one in which the system was designed, one in which data ownership issues were discussed, and a legal arena in which changes in legislation were prepared. These arenas did not match exactly with the (sub)project that had been identified beforehand; moreover, issues concerning the system, data ownership, and legal issues evolved more than one moment in time and in various (sub)projects, and sometimes, at specific moments in time, issues were more or less explicitly related to each other (e.g., the data ownership and legal issues).

Eventually, it was decided to attribute data management issues related to general data (in terms of procedures for gathering, registration, manipulation, and dispersion of data) to the Center for Vehicle Technology and Information and issues related to specific data to various ministries; it was also decided to attribute system management responsibilities (system development, maintenance, educating personnel, etc.) to the Center for Vehicle Technology and Information. In this way, a division of tasks emerged that was intrinsically complex but more or less compatible with the (institutional) diversity of interests.

## Reflection and Lessons Learned

In the cases of GBA and NKR, political-economic logic resulted in very sensitive decision-making processes regarding the development of interorganizational information systems. It is striking that, in both cases, discussions and struggles over control and data ownership took place in arenas that did not overlap with the subprojects that had been defined beforehand. Moreover, arenas and (sub)projects were intertwined. Crucial to the

advancement of these initiatives was that solutions to the complex problems were achieved by coupling issues from various arenas at strategic moments in time (e.g., the coupling of legal issues with issues regarding system and data management can be characterized as making use of windows of opportunity rather than of deliberate prespecified choices). In the literature on complex decision making, there seems to be an increased appreciation for specific techniques that are expected to be able to better fit the dynamics and nature of networks and interorganizational relationships than do project management techniques; namely, process management techniques (de Bruijn et al., 2002; Homburg & Bekkers, 2002). By using process management, the fact is accepted that decision making takes place in various arenas that are not defined beforehand; the element of risk in terms of policy windows or windows of opportunities, as perceived by the parties involved, is a solution to problems rather than a phenomenon to be ignored. It is the explicit role of the process manager to have a sharp eye for policy windows as random events, as these events provide the opportunity to couple decision-making processes in various arenas. In doing so, it is very likely that solutions can be reached that are impossible to accomplish using regular project management techniques.

The development process of GBA and NKR probably is understood better from the point of view of process management than from the point of view of project management. Therefore, I claim that process management techniques provide a more fruitful alternative to project management techniques, as the former seem to be better able to deal with the dynamics and nature of interorganizational relationships than the latter can. Therefore, the use of process management techniques in the development of interorganizational information systems (and in the integration of back offices) provides a promising perspective on the problem of integrating the back office of e-government initiatives. Central to the idea of process management of (interorganizational) ICT is that managing interorganizational ICT requires attention to processes of consensus building and cooperative behavior rather than that of a step-by-step development of an ICT architecture. Since the process of consensus building and establishing cooperative behavior is very hard to achieve beforehand, process management's goal-seeking behavior (within general constraints) is more appealing than project management's goal formalization.

## CONCLUSION

In this article, I have analyzed information exchange that has taken place under the heading of two e-government initiatives. By using a political economy point of view on exchanging information in networks of organizations, it is concluded that information exchange is a very sensitive subject. This premise has been illustrated by presenting anecdotal evidence of the TransLease and NHS cases. In the interorganizational relations in which information exchange takes place, more than operational standardization takes place; moreover, with standardization of automated information exchanges, existing dependencies, positions, and interests possibly are affected. In practice, even data wars have been observed that were associated with the specific nature and dynamics of interorganizational relations. In the GBA and NKR cases, crucial to the advancement of e-government initiatives was the notion that actual development of information systems took place in various arenas (e.g., a system design arena, a data ownership arena, and a legislation arena) that had not been identified beforehand but that rather emerged. By coupling issues and decisions in various arenas, gradually, a goal-seeking management approach proved to be fruitful in overcoming painstaking conflicts of interests. This kind of management strategy and tactics is known as *process management* in the literature, and the cases in this chapter show that process management approaches are well suited to deal with the nature and dynamics of the habitat of e-government initiatives—networks and interorganizational relations. Process management techniques provide interesting and fruitful strategies to deal with the challenges and, therefore, are an attractive alternative to traditional management techniques in ensuring viable e-government initiatives.

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## KEY TERMS

**Arena:** Set of actors that negotiate and seek consensus with respect to specific issues, guided by institutions and/or (often self-selected) rules.

**E-Government:** Redesign of information relations with stakeholders in the environment of the focal organization.

**Integration:** Standardization of data definitions and data models in or between organizations.

**Policy Window:** Opportunity for linking decision making in various arenas.

**Political Economy:** Mechanisms of exchange of information, (interorganizational) dependencies, interests, and power in or between organizations.

**Process Management:** Management approach (toward information systems development) focused on coupling decision making in various arenas, such as legal, organizational, and technological arenas.

**Project Management:** Management approach (toward information systems development), in which risks are being minimized by breaking down large efforts in small, controllable subactivities.

## ENDNOTE

[1] A similar case description exists for the Dutch value chain of penal law enforcement (Grijpink, 1997).

# Managing IT Outsourcing for Digital Government

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## INTRODUCTION

IT outsourcing has become an increasingly important strategy in meeting the demand for digital government services in many developed countries. In the United States, government IT outsourcing is expected to become the fastest-growing segment of the overall federal IT market.[1] In 2002, the federal government spent US$55 billion on IT service contracts (Harris, 2003). The European Union also witnessed mega government IT outsourcing deals. One of the most visible deals is the British government's National Health Service modernization plan, which features a host of multi-year IT outsourcing contracts whose total exceeds £5 billion (Collins, 2004). Government interest in IT outsourcing will likely be sustained by growing interest in creating value for citizens (Accenture, 2002).

The confluence of many factors has made IT outsourcing an appealing option for governments around the world. Governments around the world are facing the challenge of delivering more services with fewer resources to meet the demands of their citizens and businesses. Information technology is able to increase efficiency in service production and delivery. However, alone, governments find it difficult to provide the financial resources and competitive wages which attract needed IT talent to deploy e-government services (National Academy of Public Administration, 2001). Against this background, outsourcing becomes a value proposition for government. With outsourcing, government can gain access to IT expertise while gaining efficiency derived from private-sector economies of scale. Nevertheless, good management is needed to realize IT outsourcing's potential for creating value.

This article focuses on IT outsourcing in the public sector, analyzing management issues, and offering practical solutions. The background section defines IT outsourcing as well as its associated benefits and risks. The next section offers a process-oriented practical methodology as a tool for public managers to navigate the entire life cycle of IT outsourcing projects. More importantly, this process provides a structured way to maximize benefits and minimize costs associated with IT outsourcing. Then, a discussion of future trends examines IT outsourcing issues on the horizon. This article concludes with a general set of recommendations.

## BACKGROUND

IT outsourcing by government is the utilization of external organizations for the production and/or provision of information technology services. This external organization is usually a company that provides IT services. The types of services include networks, applications, data centers, Web-hosting, and so forth. Britain's outsourcing of desktop operating systems and applications for the National Health Service, using Sun Microsystems, is an example (Sun Microsystems, 2004). Another example is the U.S. Navy-Marine Corp's multi-billion intranet outsourcing contract with Electronic Data Systems (EDS) (Wait, 2002).

Maximizing the benefits of IT outsourcing begins with a background analysis of its associated benefits and risks. The ultimate value of IT outsourcing lies in using information technology to transform business processes to meet the objectives of the organization (Accenture, 2003). It goes beyond merely having access to networks or more computing power. The real value comes from using information technology to reengineer business processes. This transformation entails better, faster, and more affordable services.

More specifically, the benefits associated with IT outsourcing include access to IT expertise, cost-savings, quick deployment, improvement in cash flow management, and flexibility in employment (Antonucci et al., 1998; Chen & Perry, 2003b). When a new major IT project is developed, governments often find themselves lacking the necessary IT expertise. This is due mostly to the fast-changing nature of information technology and government's competitive disadvantages in hiring and training skilled IT personnel. Cost savings are possible via leveraging economies of scale at the vendor side. For example, rather than building network capacity one government agency at a time, governments can outsource network services to network companies that can provide

identical services at much lower unit costs. Quick deployment is a natural consequence of the increased technical and financial capacities obtained through a service provider.

The benefit of cash flow management can be realized by arranging with private companies to pay only for ongoing services (Gant, Gant, & Johnson, 2002). The service provider provides the initial capital investments and recovers costs through service fees over time. Flexibility in employment is another benefit of IT outsourcing. Service providers are more flexible than governments when responding to changes in demands for specific IT skill sets.

However, IT outsourcing can also expose government to a number of risks. One is the loss of control over service level and service quality. Control is particularly difficult to exert when there is a large gap between what the government knows about service level and quality and what the service provider knows. With incomplete access to critical information, government may find it difficult to validate the claims of its IT service providers. Security is another risk factor, particularly when critical data is stored in facilities outside government perimeters. Government network-connected information systems supported by service providers may subsequently be subject to security threats. Moreover, training and background screening of IT personnel are important in addressing security threats.

Complex procurement processes and employment issues pose two types of risks for IT outsourcing by a government (as opposed to outsourcing by a private company). Cumbersome procurement rules and procedures in the public sector tend to prolong the negotiation and implementation of IT outsourcing contracts. Employment issues are particularly salient in government. How personnel are treated in an IT outsourcing deal may significantly impact the overall success of the project. The importance of this issue has been reflected in several recent IT outsourcing projects. For example, in one outsourcing project, the state of Pennsylvania guaranteed no lay-offs to ensure the support of the existing IT staff for the project (Tungate & Michael, 2002).

## MANAGING IT OUTSOURCING: A PROCESS-BASED APPROACH

Public managers play a central role in realizing the full potential of IT outsourcing while minimizing its risks. The proposed process model is generic for governments of diverse needs and types. The discussions below focus on individual phases in the process also address the public sector. The model presents a "process" that governments must undertake as they plan and execute IT outsourcing projects. Following this process and attending to issues as they emerge at each phase, significantly increases the chance of capturing the benefits of IT outsourcing while minimizing entailed risks.

This process-oriented approach requires that digital government managers adopt a different mindset. An IT outsourcing arrangement should be treated as an ongoing relationship that requires constant adjustments. This approach is best suited for complex public sector environments with changing political leadership and competing objectives. Moreover, an IT outsourcing arrangement, by its nature, progresses through a lifecycle (a process). The proposed process model consists of six phases and has been adopted and modified from Chen and Perry (2003a).

### Determination of a Sourcing Strategy

In the first phase, public managers need to define the sourcing strategy. This involves defining the government's strategic business goals and ensuring that IT aligns with them (McIvor, 2000). At this phase, the focus is on the government's strategic IT goals (i.e., affordable citizen-centric quality online services). The determination of sourcing scope and strategy requires an adequate level of internal IT management capacity. An experienced IT management team is more capable of assessing the associated benefits and risks. The proper level of IT management capability is critical for making informed selection of service providers, managing relationships, and making performance adjustments.

The sourcing strategy for government has three general objectives: continuous service improvement, business continuity, and compliance with relevant laws and regulations. In formulating a sourcing strategy, the organization must consider how to continuously improve service. Business continuity is another issue in determining the sourcing strategy. The strategy must provide sufficient safeguards against IT service disruptions caused by major disasters. The safeguards should be placed in a risk-management framework to help prioritize service items for business continuity. Compliance with relevant laws and regulations is another objective of the sourcing strategy. Thus, privacy, security, and employment regulations are likely to comprise the main issues.

### Analysis of Sourcing Needs and Operational Relationship

Translating the strategic objectives into specific sourcing needs and operational relationships is the main task of the second phase. Prior to considering a specific vendor, government first must specify the information system's functional requirements that enable the delivery

of strategic IT services. For example, business continuity may be defined by performance measures such as time required for bringing service back online after a major disaster.

When outlining possible operational relationships with service providers, government should take a partnership approach. This would involve identifying the strengths of a service vendor and specifying how those strengths may complement government operations. For example, Northern Ireland's health service was looking for a centralized data center solution to address its fragmented and increasingly costly databases (McCue, 2003). It sought a service provider experienced in data migration, system integration, and centralized data centers.

In determining the role that the service provider will play, government must examine each phase of the system development lifecycle as a systematic way of developing the functional requirements. These requirements will in turn give a clear indication of needed operational relationships. Armed with specifications for the functional requirements and operational relationships, public managers are ready to proceed to the next phase.

## Selection of Service Providers and Contract Negotiation

The first step of this phase involves continuing to build an in-house IT management team for the purpose of engaging service providers and reviewing contracts. This team should possess technical knowledge capable of evaluating the merits of competing contract bids. It should also be equipped with contract negotiation and management skills. Though outsourcing arrangements vary significantly, government must find service providers that can provide complementary operational competency as well as adaptive and integrative services. System integrators are preferred because they can manage system integration as well as adapt to change. Integrators are relatively more adaptive because they are not locked into a particular platform or application. They can deal with rapid changes in technology and service needs by introducing new products and services.

The IT outsourcing contract should be a service-level agreement that incorporates performance matrices, data stewardship, and penalty clauses. Performance matrices capture the measures used to monitor performance levels in critical areas such as uptime for business continuity, user satisfaction with overall performance, and ability to handle complex requests. Data stewardship addresses privacy and security concerns. The agreement must delineate the responsibility boundaries for securing data stored in an information system. Penalty and termination clauses—such as those featuring dispute resolution mechanisms, for example—should be established to address the possibility of unsatisfactory services or interruption of services (Lee, 1996). The signing of service contracts concludes this phase.

## Transition to the Service Provider

For government IT outsourcing, the transition encompasses both the employment and information system dimensions. Government must formulate and execute a comprehensive plan to smooth the transitioning of in-house personnel affected by the project. This may involve training programs or employment opportunities with the service providers. Employment issues must be carefully addressed, as they may prove to be one of the most controversial items, particularly in light of political and regulatory situations surrounding any government agency.

The information system dimension includes data/system migration and system integration. The magnitude of this task depends on the complexity of the existing system, the quality of data, and the extent of change involved. During the migration, a protocol for protecting privacy and securing systems is necessary for accountability. This protocol must map steps involved in migrating data and systems.

Government should budget ample resources to manage the transition in both dimensions. This phase, compared to other phases, is probably the most resource-intensive. Much resource is required for cleaning the data, establishing common standards, and migrating to the service provider. Additional resources should be budgeted to cover unforeseen costs.

## Service Performance Management

This phase involves managing the service performance of the ongoing outsourcing relationship. One important objective of this phase for government is to align performance measures to the strategic objectives outlined in the first phase. During this period, service needs are likely to change due to changing circumstances in market conditions or regulatory requirements. In response, government should review its sourcing strategy to determine the changes needed for performance requirements or service enhancements.

Maintaining frequent and quality communication with service providers and key stakeholders allows government to better manage service performance. Communication has the purpose of addressing service problems and identifying tasks for continuous improvement. This effort can be enhanced with a performance management information system that can capture performance information (Rubin, 1997). Moreover, a dedicated IT manager

or management team is critical for success in managing service performance. This team needs adequate resources if it is to stay focused on the strategic goals, conduct continuous improvement, and facilitate timely exchange of service information and expectations.

## Contract Termination, Renewal, and Transition Management

This last phase involves managing the expiration of an existing IT outsourcing contract. This phase is least understood and discussed but of prominent importance in maintaining business continuity and improving future IT services. If not properly managed, governments are likely to see their services disrupted. Another possible challenge is contract transition from one service provider to another. Due to long-term dependence on the service provider and high costs of transition, government may find itself locked in by its existing vendor. Lack of experience and planning on the part of government may further impair its ability to navigate the transition (Peled, 2001).

During the selection of service providers and contract negotiation phase public managers have the opportunity to specify terms for contract termination, renewal, and transition. The clauses for termination and transition provide a structure and process for both the government and the service provider. These clauses should address both personnel and information technology assets. For example, San Diego County developed a specified depreciation schedule for each of its technology assets (Peterson, 2004). To avoid possible contract lock-ins, public IT managers should choose standard infrastructure and application solutions rather than developing customized ones.

To further ensure success in contract transition, public IT managers can develop a process specifically focused on human resources and physical assets. This process would incorporate issuing a request for proposal at least one year before contract expiration. Moving IT services back into government should also be considered as an alternative. The request for proposal should be supported by information gathered in the service performance management phase and it should involve a re-evaluation of sourcing needs and operational arrangement. This proposal should feature data and solutions that directly address the transition of staff members and information technology assets.

# FUTURE TRENDS

Public managers need to understand future trends in IT outsourcing to manage outsourcing effectively. The first important trend is the maturing of the IT outsourcing market, a maturity indicated by its expanding global scope. Global sourcing by European countries—as part of a worldwide sourcing phenomenon—will witness strong growth (Gartner, 2003, 2004). Outsourcing an entire array of IT services, such as outsourcing an entire business process, has also gained momentum.

Also, security and privacy will become critical elements in government IT outsourcing. In the U.S.'s 2003 federal budget, over a quarter of IT spending was security-related (Porteus, 2002). Since government is the last line of defense in disaster situations, government requires that contractors ensure business continuity by implementing needed security measures. Any government IT outsourcing project also needs to safeguard citizen privacy. For example, the European Union's 1995 Directive on the protection of personal data deals with confidentiality in the use and movement of data. It prescribes a privacy policy for EU governments to implement in IT outsourcing.

Another development is the growing popularity of partnerships between government and the technology industry. In the partnership model, financial risks associated with digital government projects can be shared. For example, the partnership model makes possible a wide range of financial solutions for the Interagency Public Key Infrastructure in the United States (Cahan, 2002). Of further benefit, the partnership model can help governments cope with rapid changes in technology and service needs, a critical capacity which may otherwise be unavailable in traditional purchasing models.

# CONCLUSION

IT outsourcing has become an increasingly popular way of deploying digital government services. With the maturing of the IT outsourcing market and increases in government management capacity, there is significant potential for transforming government's current use of information technology. IT outsourcing has the benefit of leveraging private-sector financial resources and technical expertise. Public managers can use IT outsourcing to deliver value to citizens while controlling risks. This article has offered a process-based methodology as a tool for public managers to realize the full potential of IT outsourcing. This process begins with identifying a sourcing strategy, culminates with on-going performance management of the outsourcing relationship, and ends with contract termination and transition.

The process methodology calls for a relationship-based approach focused on the entire lifecycle of an IT outsourcing project. The relationship-based approach

moves beyond one-time procurement thinking and seeks to map out a long-term relationship. An on-going relationship requires frequent adjustments, depending on market conditions and changing service needs. Thus, a performance management team is needed to maintain quality and frequent communication.

Several key recommendations can be drawn from the process model. First, public managers must constantly align every phase of the process to the strategic goals of IT outsourcing, focusing on quality and affordable service, security, and business continuity. Second, government must anticipate political and legal considerations surrounding an IT outsourcing project. Employment and privacy issues have legal implications for such projects. Finding a good strategic fit between government and its IT service provider may help sustain momentum in the event of changes in political leadership.

Frequent and quality communication among key stakeholders is also critical; such communication helps early on in the selection of service providers. Also, it is a critical ingredient for success in service transitioning and performance managing. Lastly, the commitment of top management and assurance of ample resources are essential for realizing the potential of IT outsourcing. When an organization invests in each stage of the process—from defining sourcing needs, finding strategic partners, to managing transitioning and performance—it determines whether the IT outsourcing project will fail or succeed at delivering high-level digital government services.

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## KEY TERMS

**Business Process Outsourcing (BPO):** When organizations delegate back-office functions such as human resources to outside vendors.

**Digital Government:** The use of information and communication technology to deliver information and services to stakeholders including citizens, businesses, nonprofit organizations, government employees, and other units of government.

**Global Sourcing:** Sourcing practices that involve buying services from other countries and around the world. It is an emerging practice, particularly in the area of information technology.

**Interagency Public Key Infrastructure:** The U.S. federal government's goal of providing hardware, systems, standards, and policies necessary to secure electronic transactions across federal agencies.

**IT Outsourcing:** Utilization of external organizations for the production and/or provision of information technology services.

**Process-Based Approach:** An approach to IT outsourcing based on six phases as articulated in the article.

**Service Level Agreements:** Agreements that specify the performance metrics for specific services such as bandwidth availability and response times for queries.

## ENDNOTE

[1] This is based on the number by Input Inc., an information technology research and marketing firm.

# Managing Security Clearances within Government Institutions

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## INTRODUCTION

An Internet search (Google) on government + security clearances + policy indicates that at present, establishment of individual security clearances within the government departments (and within U.S. State Departments in particular) are based on two factors:

- Evaluation of the candidate past
- Need to know policy

Evaluation of the candidates past (done very often with the polygraph use) is aimed at establishing past activities of that person. Special emphasis is placed on finding possible contacts with organizations/countries hostile to the evaluating agency. For instance, all CIA agents must periodically undergo such tests (Mahle, 2005). The results would determine possible range of security clearances of an individual.

The *Need only policy* (discussed later in the article) is further used to adjust security clearances of individuals. We (the authors) we unable to find practical realization of the *Need to know* policy and the presented research is an attempt to cover this gap.

Managing information security depends on business environment, people, information technology, management styles—to list the most important. Within this domain, the following seem to be recognised as routine procedures:

- **Development of a Strategic Plan to Protect Information Resources of the Business Organisation:** Despite the existence of enough evidence indicating constantly increasing number of security violations and resulting losses, the majority of business organisations failed to develop their security managing strategic plans. Fifty percent of them do not have even a disaster recovery plan (Jordan, 1999). Without such a plan, any effort to tighten up security of information within the organisation is a non-effective procedure
- **Development of Information Security Policy (ISP):** ISP is a document that outlines the main checkpoints that are directed specifically at an individual organisation's operations (Forcht, 1994). ISP could be a page or many pages depending on the level of details of the checkpoint procedures (Leung, 1998).
- **Classification of Security Levels, Security Clearances, and Security Labels:** This is the domain of the security models, starting from classic Bell-La Padula, Biba and USA Department of Defence Orange Book models. Security levels deal with the classification of information in terms of its accessibility. Security clearances determine the rights of persons/program to access the data. Security label is a mechanism to match security levels and security clearances
- **Development of Reference Monitor:** Virtually every security policy can be modelled in terms of subjects (people and programs) accessing objects (information either in electronic form or hard documents). This view of security policy implies that some decision procedure should exist to decide which requested accesses should be allowed and which should not. It acts as a filter through which all access requests made by subjects must pass. The term "access" means rights to read a document only, or to change it, or even destroy. This type of filter has come to be known as a Reference Monitor. (Amoroso, 1994). There are numerous publications presenting research in the field (e.g., Janczewski & Low, 1998). The research concentrates mainly on the issue of how to build and run a reference monitor
- **Technical Issues Related to the Development of a Security Kernel:** The reference monitor manages the controlled access to particular information but there are numerous technical issues related to the development, implementation and running of a sys-

*Figure 1. Taxonomy of assigning security clearances methods*

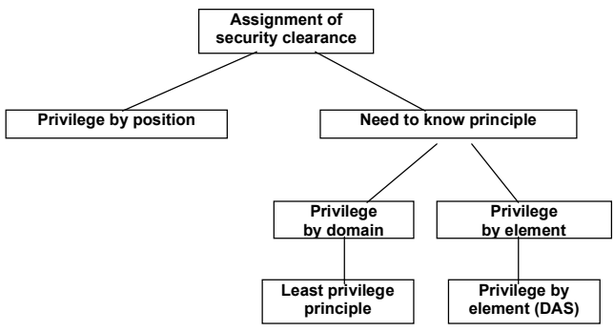
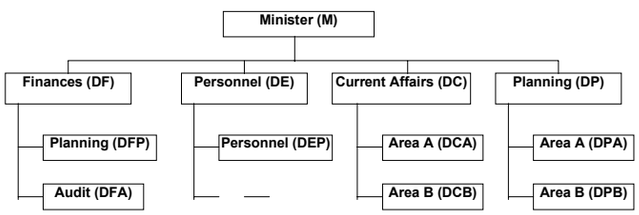



*Figure 2. Organisational structure of the department*




*Note: Abbreviations (in brackets) will be used later in the text to denote the positions*

tem in a secure way. "Secure way" means that information is protected against unauthorised access or change, and is available on request.

An analysis of the previous chain of security arrangements shows a significant weak point. It is the procedure of assigning security clearances to an individual. In a typical business environment, this procedure is based on the position of a given person within the hierarchy of an organisation. The general principle is that "the higher a person is within the company hierarchy the higher security clearance he or she must have." This approach clearly incurs significant problems. In the one extreme a person might have a security clearance that is too high for his or her job, which increases the total cost of the security system. Higher security clearance incur higher cost (for instance of security training). On the opposite side a person with a security clearance too low for his or her job must obtain temporary authority for accessing specific documents. This could be costly as well, time consuming and it could decrease the efficiency of operations. Portougal and Janczewski (1998) demonstrated in detail the consequences of the described approach in complex hierarchical structures.

A competing and more logical idea is to apply the "need to know" principle. Under this principle, everybody has access only to the information needed to perform direct duties. Unfortunately, this principle does not give adequate guidance to the management as to how to set-up security clearances for each member of the staff. Amoroso (1994, p. 298-299) describes the "principle of least privilege." The recommended application is based on subdividing the information system into certain data domains containing secret or confidential information of similar types. Users have privileges (or rights to access) to perform operations for which they have a legitimate need. "Legitimate need" for a privilege is generally based on a job function (or a role). If a privilege includes access to a domain with confidential data, then the user is assigned a corresponding security clearance. The main flaw of this approach is that a user has access to the whole domain even if he/she might not need a major part of it. Thus the assigned security clearance may be excessive. A similar problem arises regarding the security category of an object. A particular document (domain) could be labelled "confidential" or "top secret" even if it contains a single element of confidential (top secret) information.

*Table 1. Database elements listing*

| | Database elements | CP |
|---|---|---|
| 1 | Budget | 1 |
| 2 | Staff | 1 |
| 3 | Salary | 1 |
| 4 | Issues | 1 |
| 5 | Issues (by cost) | 1 |
| 6 | Issues (by department) | 1 |
| 7 | Budget (by department) | 1 |
| 8 | Salaries (by department) | 1 |
| 9 | Staff (by department) | 1 |

Another realisation of the "need to know" principle is based on data access statements (DAS), defined for every employee as part of their job description. DAS lists all data elements needed by an employee to perform his or her duties effectively. Thus the assignment of security clearance is shifted from the domain level to the element level. This approach allows not only defining individual security clearances, it also connects this problem to more general problems of the security of the organisation as a whole, including the problem of security cost and cost optimisation.

Figure 1 summarises existing methodologies of assigning security clearance to members of organisations.

## A GOVERNMENT FACILITY EXAMPLE

To illustrate the problem of data security in a government environment we consider the case of a government department. Within this department there are four divisions, each of them in charge of one or two groups of subjects. The "Current Affairs" division deals with issues directly related to the main thrust of the department activities.

It should be noted that:

- Each division deals with different subjects
- Each organisational unit employs at least one manager
- If a person has access to specific data but uses only part of it, it is assumed that he or she is using all of it. Therefore all data collected is used

The department has an information system. Table 1 lists all the data elements used within this organisation. Every data element has an assigned confidentiality parameter (CP), which characterises its importance from the point of view of security. For more about assigning CP's refer to Portougal and Janczewski (1998).

In this example, we assume that each data element is independent, so knowledge of a particular element does not allow one to find the value of the other. In order not to overcomplicate the example we assume all CP equal to 1.

Schuler (1992) defined the following components of a job description:

- Job or payroll title
- Job number and job group to which the job belongs
- Department and/or division where the job is located
- Name of incumbent and name of job analyst
- Primary function or summary of the job
- Description of the major duties and responsibilities of the job
- Description of the skills, knowledge, and abilities
- Relationship to other jobs

The job description is the best place to define the security clearance of employee through DAS. It could be, for instance, an additional "bullet point' in the previous list.

Formally DAS (Portougal & Janczewski, 1998) was defined as follows:

1. *Data access statements* (DAS) of a staff member is a vector, containing *data access statements elements* (DASE) as its components
2. Each DASE defines what type of access to information/data is allowed (read, write, delete, etc)
3. Each DASE is defined as a result of the analysis of the job description document related to the given position
4. Each DASE has a confidentiality parameter CP assigned (being an element of the organisation's database it should have the same value CP, e.g., from Table 1)

DAS statements for the organization presented in Figure 2 are shown in Table 2. The row numbers indicate corresponding DASE, like "1" denotes the Budget. The columns corresponds to each manager (the headers were taken from Figure 2. At the bottom row the total value of information accessible is shown (T). This is the SCV–*Security Clearance Value*, thus tying the assignment of a security clearance to the volume of accessible information.

## MODELLING SECURITY CLEARANCES

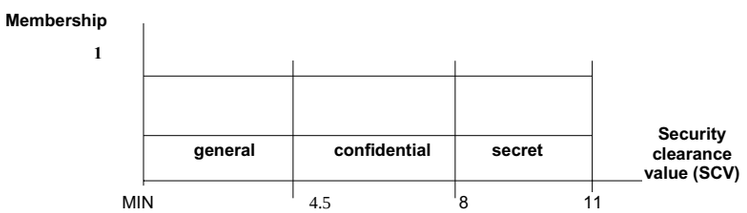
It is obvious that there is a correlation between security of the system, numbers of security measures, and their costs, for example:

***more security measures ⇒ more secure system ⇒ more costs***

*Table 2. DAS for all employees of the Ministry*

| | M | DF | DE | DC | DP | DFP | DFA | DEA | DEP | DCA | DCB | DPA | DPB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | √ | √ | √ | √ | √ | √ | √ | | | | | | |
| 2 | √ | √ | √ | √ | √ | | | √ | √ | | | | |
| 3 | √ | √ | √ | √ | √ | | | √ | | | | | |
| 4 | √ | √ | | √ | √ | √ | √ | | | √ | √ | √ | √ |
| 5 | √ | √ | | √ | √ | √ | √ | | | √ | √ | √ | √ |
| 6 | √ | √ | √ | √ | √ | | | | | √ | √ | √ | √ |
| 7 | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ |
| 8 | √ | √ | √ | √ | √ | | | √ | | | | | |
| 9 | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | | |
| T | 9 | 9 | 6 | 9 | 9 | 5 | 5 | 4 | 2 | 4 | 4 | 4 | 4 |

*Figure 3. Security levels (crisp representations)*




Many sources (only one source is listed) (Frank, 1992, Figure 1) indicate the previous correlation is not linear but rather has a tendency to grow exponentially. Similar situations exist in the case of assigning security clearances. The higher security clearance of an employee means a higher expenditure to the employer. The structure of costs would be somehow different from the security measures previously listed. The costs like those listed next would be of significance:

- Examination of candidate credentials
- Security training
- Security equipment (especially for accessing protected zones, either physical or system)
- Management of the system controlling the security clearances

Again one might expect that there is a correlation of security clearances with costs:

***higher security clearance granted ⇒ higher costs for the organisation***

The security clearances are designed to subdivide the employees of the organisation into classes according to data access privileges (e.g., secret, confidential, and general). Following the usual approach, borderlines should be drawn, defining the minimum amounts and importance of data in use for each category. Sometimes this subdivision is performed either by employees' position or by assigning security levels to data domains, and then using these levels for defining clearances. With the CP and SCV defined the problem becomes more logical to solve.

In our example (Figure 3), let us have three security levels: *general*, *confidential,* and *secret*. We shall define the borderline SCV between *general* and *confidential* as 4.5, and the borderline SCV between *confidential* and *secret* as eight. If the total SCV of information in use by an employee is less or equal to 4.5, then this person is not required to follow special security procedures at all, and he/she would be assigned a general clearance. If the total SCV is between 4.5 and eight, then the *confidential* clearance should be applied, meaning that this employee is under an obligation to use and follow all the security procedures defined for this clearance. Similarly, if the SCV of data in use is more than eight, then this employee should be assigned the *secret* clearance.

Though this procedure is simple and easy to understand, nevertheless it has two weak points:

1. This procedure implies that the security experts will be able to define the borderlines. In reality, it is not so easy, and sometimes the decision about the borderlines is provided by reasons well outside the model, for example by position

2. Under this procedure, it is hard to explain why employees with SCV close to the borderline from different sides have different clearances. What is the crucial reason for an employee with SCV equal to 7.95 has a clearance *confidential*, but his colleague with SCV =8.03 has *secret* clearance

Both points indicate an inadequacy in this security clearance model. Basically, the inadequacy comes from using a classical *crisp set* for modelling, like those used by Pfleeger (1997). The crisp set is defined in such a way as to dichotomise the individuals into two groups: members (those that certainly belong to the set) and not members (those that certainly do not). A sharp distinction should exist between members and non-members of the class. This is definitely not so in our case. The classes of security clearances do not exhibit this characteristic. Instead, the transition from a member to a non-member of one class appears gradually rather than abruptly. This is the basic concept of fuzzy sets.

In the first fuzzy model example it is assumed only two security clearance classes: *general* (set G) with no security cost and *secret* (set S) with a security cost *A* for each member of the class. The membership functions of class S are given in Figure 4. The vertical lines on Figure 4 represent the employees of the Department and the value of their membership function in the set S. The Minister and most of his or her deputies have the value equal to 9/9, Head of the Personnel Division has it equal to 2/9, Head of the Area B Planning Division has it equal to 4/9, and so on (as 9 is the total value of information within the Ministry).

If we assign to every manager the security clearance *secret*, then the cost of the security system will be equal to 13*A* (As there are 13 managerial positions in the company). If this is not affordable, then some of the managers will be put into G class. This involves a risk of information leak.

*Figure 4. Membership function for the fuzzy set "secret"*

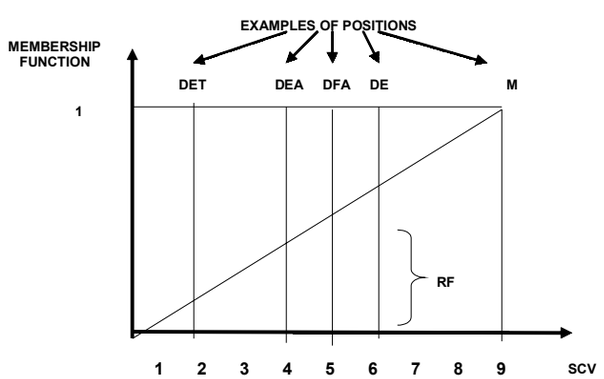
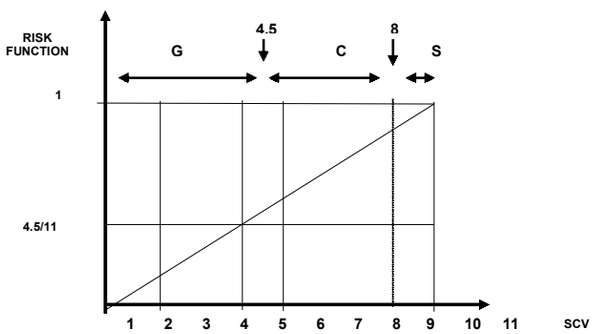



*Figure 5. Risk function and its cover by 3 classes G, C, and S*




Let us assume that this risk is proportional to SCV (the more a person knows the higher is the risk). We shall introduce the *risk factor* (RF) for an employee *i* as:

$$RF_i = SCV_i / SCV_{max}$$

A good estimate for the *company risk factor* (CRF) would be either:

$$CRF_{max} = \max_i RF_i,$$

or

$$CRF_{av} = S_i RF_i / N,$$

where N is the total number of employees. $CRF_{max}$ characterises the risk of information leak from the most informed employee. It is better for evaluation than $CRF_{av}$, when the $SCV_i$ of the employees are diverse. Sometimes both are useful.

The risk factor can not be used directly for the evaluation of real security threats. It is only a coefficient in a more complex equation with unknown chances of a breach of security and losses from it. But the assumption of its proportional value to the security risk gives it a good comparative meaning (Figure 5).

Let in our example the department has a security budget of 4*A*, or that it can afford to assign the secret clearance only to four top three employees: M, DF, DC, and DP. The security risk factors will be:

$$CRF_{av} = (0+0+6+0+0+5+5+4+2+4+4+4+4)/9/13 = 4.2/13.$$

$$CRF_{max} = 6/13$$

If we increase the security spend to 5*A* (7.7% increase, one more person classified as S), then the $CRF_{av}$ will drop

to 3.5/13 (5.3% decrease), and $CRF_{max}$ would not drop by 7.6%. However there could be cases when there is no change of the $CRF_{max}$ . Then it cold be worth to think whether to increase the security spend or not. Thus, the main benefit of the CRF is the possibility to use it for comparing different assignments of security clearances.

Though the two presented models are too simplistic, nevertheless it shows the main problem of a security system design. The problem is that practically no organisation can afford a security system with a zero risk factor, and it is forced to look for a suitable trade-off between the cost and the risk factor.

We shall show that introduction of intermediate classes helps in security improvement without cost increases.

Let we introduce an intermediate clearance *confidential* (set C). We shall assume that the security procedures designed for this clearance eliminate the risk of data leakage for all employees with $SCV_i$ no more than 4.5. Let the cost of these procedures be $B = A/3$, and the security is $3A$. The possible variant of assigning clearances to employees is shown in Fig. 5. In this variant we sacrifice the clearance S for the DE, changing it to C, which incurs a security risk factor of (6-4.5)/13. The security risk factors will be:

$$CRF_{av} = (0+0+5+0+0+5+5+4+2+4+4+4+4)/9/13 = 3.2/13.$$

$$CRF_{max} = 5/11.$$

This shows a significant improvement in security estimates.

Generally, an analysis of both company risk factor functions $CRF_{av}$ and $CRF_{max}$ show the best way for their optimisation, but this analysis is outside the scope of this article.

## SECURITY MODELLING FOR DATA ELEMENTS WITH DIFFERENT CONFIDENTIALITY PARAMETERS

One of the assumptions of the described model is that CP is equal for all the data elements. This assumption restricts the area of this model implementation to the organisations that consider all data elements equally important. In most cases, the data elements are conceptually not homogeneous from the confidentiality point of view. It is not very difficult to accommodate this. Portougal and Janczewski (1998) suggested an expert evaluation procedure that helps to establish real values of CP from the point of view of security experts.

The method of calculating $CRF_{av}$ and $CRF_{max}$ stays the same but DASE would have different values thus shifting the position of an individual along the horizontal axis (Figure 3).

## CONCLUSION

The suggested method will improve the data accessibility and at the same time the security of information systems, which is very important for the digital government.

1. By introducing data access statements (DAS) as part of employee's work description, access to information is granted to every employee on the data element level as opposed to the existing practice of granting access on a domain level
2. We suggest changing the existing practice of assigning security categories to data base domains, and to assign instead a confidentiality parameter (CP) to every element of the database. The data base will be characterised from the confidentiality point of view in more detail
3. We showed that current crisp models of assigning security clearances do not include cost and efficiency optimisation. Instead we developed optimisation models, based on fuzzy sets theory
4. As a measure of efficiency of the security system we introduced the company risk factor (CRF), which makes possible to compare different ways of security organisation under a limited budget

Further research in this direction include the development of optimisation models, based on analysis of both company risk factor functions $CRF_{av}$ and $CRF_{max}$ and the structure of the set of feasible solutions. Another direction of research includes the development of models optimising costs of the security system under risk constraints.

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## KEY TERMS

**Confidentiality Parameter:** Numerical expression of Security level.

**Data Access Statement (DAS):** A list of all data elements needed by an employee to perform her/his duties effectively.

**Data Access Statement Elements (DASE):** Elements of DAS. Each DASE defines what type of access to information/data is allowed (read, write, delete, etc).

**Information Security:** A discipline which deals with three important information parameters:

- **Confidentiality:** the prevention of unauthorised disclosure of information.
- **Integrity:** the prevention of unauthorised modification of information.
- **Availability:** the prevention of unauthorised withholding of information or resources.

**Information Security Policy:** The document reflecting all the decisions and activities for company employees in terms of protecting the information assets.

**Security Clearance Value (SCV):** A sum of all confidentiality parameters (CPs) associated with a given position of an employee.

**Security Clearances:** A security clearance is defined as a hierarchical attribute that can be associated with the users of an information system to help denote their access rights to the information. For instance in a business organization all the users having the secret security clearance may access all the information while holders of the confidential security clearance could only access the information labelled general or confidential.

**Security Levels:** A security level is defined as a hierarchical attribute than can be associated with entities within information system to help denote their degree of sensitivity. For instance, in a business organization, all the information could have one of the following security levels: general, confidential, and secret.

**Security Model:** A set of arbitrary and detailed rules defining access rights of information users within a given environment.

# Mechanism of E-Government Undertaking in Japan

M

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## INTRODUCTION

According to the report submitted by the Evaluation Committee of Experts, Government ICT Strategy Headquarters in December 2005 (ECE, 2005), Japan has already established the globally advanced e-government infrastructures for such services as online application and filing. The report also acknowledged that the quantity and quality of information, guidance and search engine at the government portal, "e-Gov", and individual government Web sites have reached almost the same level as those of the government Web sites of the other world-famous ICT nations.

These achievements have resulted from the continuous undertaking of introducing information and communication technologies (ICTs) in the government operations from 1960s (ECHMCA, 2001).

In this article, the successful accomplishments of e-government initiative are described followed by the analysis of institutional arrangements and mechanisms concerning e-government initiatives. Lastly, the future challenges will be suggested.

## BACKGROUND

The Japanese government started its government-wide efforts for the management reform of administrative affairs in the late 1950s. Coincidently, the first computer in the national government was introduced by the Meteorological Agency in 1958. Since then, the government has been aggressively introducing computer and communication equipments and systems for improving efficiency and efficacy of public administration. This undertaking was not carried out independently by individual ministries. In 1968, the Cabinet decided on the future measures for the use of computers and at the same time an interministerial committee of computer use was established to promote the use of computers in more coordinated way. The committee was organized by a central management office, the former Administrative Management Agency of the Prime Minister's Office, consisted of the representatives from all the ministries and agencies who were the heads of the data processing divisions. The committee decided the computer utilization plan every fiscal year and all the ministries and agencies carried out necessary measures for promoting computer use in their organizations based on the plan (ECHMCA, 2001).

From 1960s to 1980s, the number of mainframe computers in the government kept on growing rapidly (Kaneko, 2004a). Batch processing of mass data by huge mainframes was the way of the day. Computers were utilized initially in the areas of research and statistics and then, by late 1970s, in such areas needing process of massive data as drivers' licenses, social insurances, and so forth (Kaneko, 2001). Databases for supporting policy formulation emerged later in the 1980s.

In the late 1980s, such remarkable development as downsizing, open-system, networking and user-friendly software was achieved in the ICT field. The government's undertakings to introduce personal computers (PCs) into policy planning/development and implementation lagged behind those of the private sector. With a view to promoting aggressive introduction and exploitation of ICT, a government-wide action program was needed. In 1994, the Cabinet decided upon a Master Plan for Promoting Government-Wide Use of ICT for realizing efficient and effective public administration by aggressively making use of ICT in all the government affairs.

Based on the master plan, the introduction of PCs and construction of LANs (local area networks) in the government offices progressed reasonably. Moreover, a WAN (wide area network) system (so-called Kasumigaseki WAN), connecting all ministries to facilitate the safe exchange of information between them, was constructed and it was put into operation in 1997 (Kaneko, 2004a).

Thus, it can be said that these continuous undertakings from 1960s have paved the way to the e-government initiatives.

## ANALYTICAL VIEWPOINTS

All OECD countries have some sort of e-government program such as PAGSI in France, BundOnline in Germany and UK Online(OECD, 2003a, 2003b). Some are based on laws and top-level political commitment on the other hand other countries have a less ambitious e-

government program, in which e-government is more a method to improve government outcomes within existing structures. As all countries have an e-government program, all countries have some sort of organizations with overarching responsibility for carrying out the program. The authority of these organizations differs widely from imposing mandatory obligation to offering solutions (OECD, 2005).

In this article, mechanism of e-government undertaking includes a national e-government program and institutional arrangements for implementing the e-government program. In describing the Japanese case, two viewpoints are adopted. One is the degree of political commitment concerning an e-government program and the other is the degree of the authority of the organization that is responsible for implementing an e-government program.

## MAJOR ACHIEVEMENTS TOWARD E-GOVERNMENT

The Japanese e-government program envisages two main goals, one is to provide "user-oriented administrative services" and the other is to realize "streamlined public administration with high budget efficiency" (GOJ, 2003b). And the various initiatives have been executed based on these two goals. The major achievements of the government's actions toward e-government as of December 2005 (Kaneko, 2005)are described according to the goals of the e-government program.

### To Provide "User-oriented Administrative Services"

#### Online Processing

There has been real progress enabling citizens and businesses conduct online application and filing for almost all the national administrative procedures (GOJ, 2005). As of March, 2005, 96% of the targeted national administrative procedures are available online such as filing tax and applying for the social insurance system. As basic underpinning of online application, various initiatives have been completed such as GPKI enabling to confirm authenticity mutually, LGCA , enabling to confirm identification and the online payment systems allowing citizens to pay charges online. According to the survey conducted by the Ministry of Internal Affairs and Communications in 2004 (MIC, 2004), more than 80% of applications and filings were conducted online.

*Figure 1. Achievements in online processing*

| Achievements | Date |
|---|---|
| 96% of all administrative procedures of the national government by on-line | Mar-05 |
| GPKI (Government Public Key Infrastructure) | Apr-01 |
| LGCA (Local Government Certification Authorities) services | Jan-04 |
| E-payment system for fees and other revenues | Jan-04 |
| E-bidding for procurement and purchasing | Mar-04 |

#### Improvement of the Government Portal "e-Gov"

A government portal site, "e-Gov" (http://www.e-gov.go.jp) has been in operation since April 2001 to make the people access the government information more easily and comprehensively (GOJ, 2005). Not only guidance for administrative procedures but also a powerful search engine to look for all the government Web sites, a law data retrieval system and extensive links to databases provided by the ministries are on "e-Gov." From January 2004, the public comment information has been integrated and the policy proposals from the citizens can be accepted at "e-Gov."

#### One-Stop Service

A single window service was started for the export/import procedures and the port control procedures in July 2003 (GOJ, 2005). Likewise, a new one-stop service for registration and other procedures related to owning automobiles was started in December 2005.

### To Realize "Streamlined Public Administration with High Budget Efficiency"

#### ICT Infrastructure

Each official is provided with one PC and all ministries have completed deploying the ministry LAN environment, which is connected to the government-wide network, Kasumigaseki WAN enabling mutual access among ministry LANs (MIC, 2002). The network infrastructure in the government sector has been extended to involve LGWAN (local government-wide area network) linking the entire local governments and the judicial network (court network) linking the court branches (MIC, 2004).

### Renovating Administrative Systems and Operations by the Use of ICT

While setting up various information systems including the network infrastructure, the budget allocation for building such systems and its cost efficiency are coming to be under public scrutiny. With a view to renovating administrative systems and operations by the use of ICT, the existing information systems together with the entire government business operations were sorted out and the operations needing renovation were specified for which optimization plans were to be decided (GOJ, 2004). In each optimization plan, concrete measures including integration or shared usage of systems, outsourcing as well as the estimated savings in time and costs are to be described. It was decided in January 2004 that the optimization plans for 79 operations were to be formulated by the end of March 2006. As of December 2005, 9 optimization plans targeting the common operation of the ministries and 12 targeting the specific operations of the individual ministries have been adopted.

## NATIONAL E-GOVERNMENT PROGRAM

### Introduction

Japan has a well-coordinated e-government program as "Program for Building E-Government" (GOJ, 2003b). This program is an action plan to implement the policies for realization of e-government included in "E-Japan Strategy," a national strategy for promoting the use of ICT in the whole society (GOJ, 2001, 2003a). The E-Japan Strategy was adopted based on the ICT Basic Law. In the following, the brief outline of the legal arrangement, the national ICT strategy and the e-government program (Kaneko, 2005) are described.

*Figure 2. Achievements in optimization*

| Achievements | Date |
|---|---|
| Adoption of Optimization Plans for 9 commonly applicable operations: Payroll, Procurement, Inventory Management, Benefits & Allowances, Travel Expenses, etc. | Dec-05 |
| Adoption of Optimization Plans for 12 specific operations: Patent, Radio Wave Control, State Pension, National Forestry, Food Administration, Meteorological Services, etc. | Dec-05 |

### ICT Basic Law

In January 2001, the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (The ICT Basic Law) came into force. The objective of this law is to promote measures for the formation of an advanced ICT network society expeditiously and intensively. For this purpose, the law stipulates the basic ideas, principles and policies as well as organization for promoting measures strategically.

The law establishes the Strategy Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (ICT Strategy Headquarters).

Under the law, the Headquarters are to develop a priority policy program for the formation of an advanced IT network society, in light of the urgency to adapt the Japanese society to the world's rapid and drastic changes in the socioeconomic structure caused by the utilization of ICT.

### E-Japan Strategy and Priority Policy Program

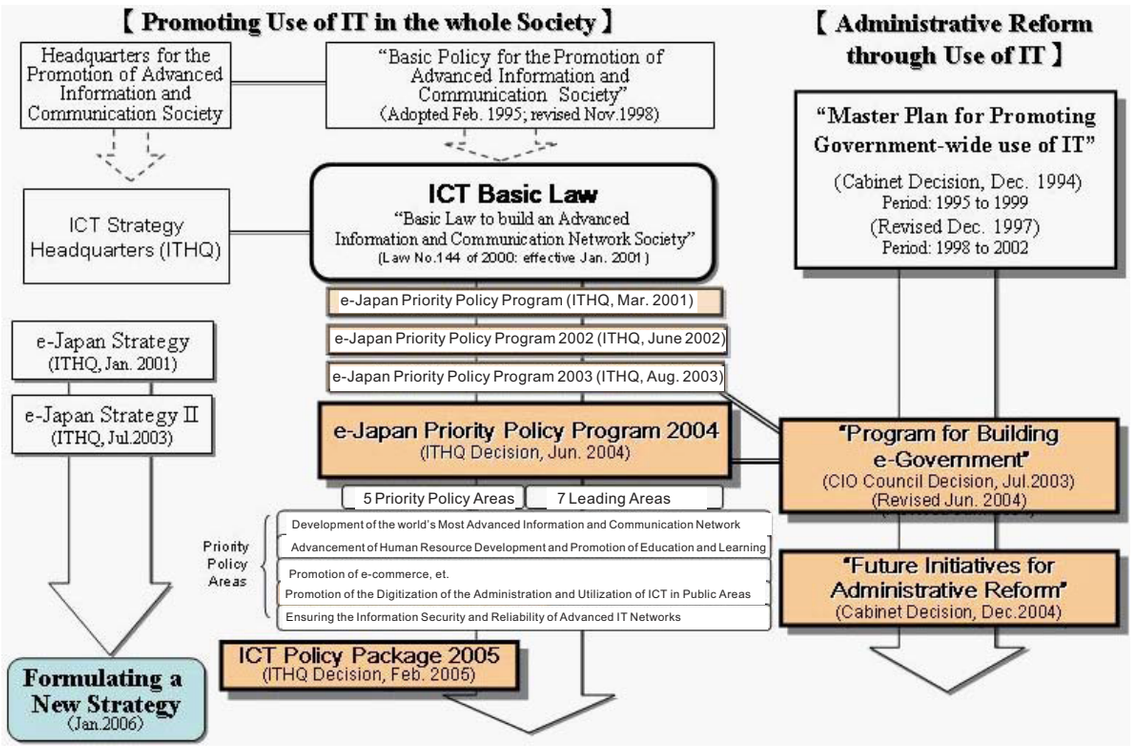
In January 2001, "E-Japan Strategy" was adopted by the ICT Strategy Headquarters (GOJ, 2001). It is a medium term national strategy aiming at making Japan the world's most advanced ICT nation within 5 years by such means as building the world's most sophisticated information and telecommunication network, which would make the citizens possible to access the Internet easily at low rates. The strategy shows the leading principles for preparing a priority policy program, a concrete work plan. The realization of e-government is identified as one of the high-priority policy areas in the Strategy.

In March 2001, the ICT Strategy Headquarters decided an E-Japan Priority Policy Program that included specific and detailed measures of the individual ministries. In the Priority Policy Program, government actions needed for the realization of e-government were described under the item of "Promotion of Digitization of the Administration and Utilization of ICT in the Public Sectors." The Priority Policy Program is an action plan for each fiscal year and it has been reviewed and amended once every fiscal year since then. The latest version, the ICT Policy Package 2005, was decided by the ICT Strategy Headquarters in February 2005.

### Program for Building E-Government

As mentioned above, the Japanese government has been undertaking the management reform of administrative affairs by the use of ICT from the1960s. With the devel-

*Figure 3. Basic framework of policies for e-government in Japan*




opment of ICT, the government came to face the challenges to reinvent and reconstruct not only its computer systems but also its business processes *per se*.

In December 1994, the Cabinet decided upon "Master Plan for Promoting Government-Wide Use of ICT" covering from 1994 to 1998. This was virtually the first cabinet decision that stated the overall policy and enumerated concrete measures of utilizing ICT inside the government. With rapid installation of PCs and network infrastructures in the government offices as well as the explosive diffusion of PCs and use of the Internet in the society, the master plan was revised in 1997 to become a new 5-year plan covering from 1998 to 2002 (GOJ, 1997).

While the E-Japan Strategy and Priority Policy Programs consolidate all the ICT policies and programs, the revised master plan stood as it was as a blueprint for creating e-government and at the same time its main policies and measures were included in the E-Japan Strategy and Priority Policy Programs.

After the completion of the target period of the master plan, July 2003, a program for building e-government was decided as the successive plan to the master plan under the ICT Strategy Headquarters (GOJ, 2003b). The program is a 3-year plan from fiscal 2003 to fiscal 2005. Over the past 2 1/2 years, various policy initiatives have been undertaken based on the program

## APPARATUS FOR PROMOTING E-GOVERNMENT

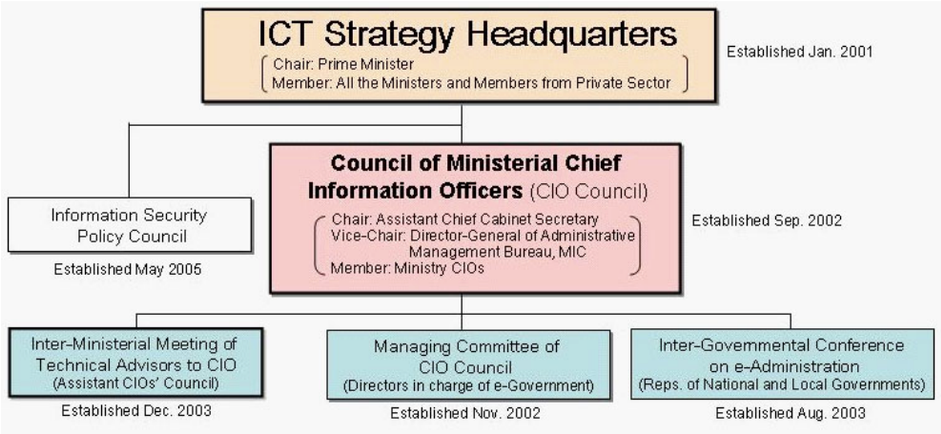
### Introduction

In any OECD country, when a country has an e-government program, it has some sort of organizations with overarching responsibility for carrying out the program. Japan has such organizations, namely the ICT Strategy Headquarters, CIO Council, Inter-Ministerial Committee of Assistant CIOs as counsel bodies and the Administrative Management Bureau of the Ministry of Internal Affairs and Communications as a substantial driving body.

### ICT Strategy Headquarters

The ICT Strategy Headquarters was established in January 2001 based on the ICT Basic Law. Headed by the Prime Minister, the Headquarters is composed of all ministers of state and ten acknowledged experts from the private sector. The main mission of the Headquarters is to hammer out ICT strategies including e-government policies. The Headquarters meets when fundamental policies or programs are to be decided. Since its establishment, the Headquarters met 34 times by December 2005. It is the

*Figure 4. Apparatus for promoting e-government*




place where the political leaders can take strong leadership to promote ICT policies for both the private sector and public sector. Based on the decisions by the Headquarters, ministries execute their own ICT policies such as constructing the advanced ICT networks and establishing necessary legal institutions enabling e-commerce rather independently.

## CIO Council

As mentioned above, an interministerial body (Inter-Ministerial Committee of Computer Use) was established in the late 1960s with a central management office, the Administrative Management Bureau, playing an overarching role. The status of this committee was upgraded into "Inter-Ministerial Committee of Directors General on Computer Systems" in 1983 with a view to strengthening its coordination functions for accelerating the use of ICT for administrative reform. Under the Committee, some inter-ministerial meetings and taskforces were organized to improve ICT knowledge and skills, to exchange experiences and professional know-how among the officials and to foster common grounds for government-wide concerted undertaking of ICT use.

After the establishment of the ICT Strategy Headquarters, the Inter-Ministerial Committee of Directors General on Computer Systems was transformed into a Ministerial Chief Information Officers Council (CIO Council) under the ICT Strategy Headquarters in September 2002.

The Council, headed by the Assistant Chief Cabinet Secretary, is comprised of all ministry CIOs, who are usually the Directors General of the Minister's Secretariat or their equivalents. Ministry CIOs are in charge of overall systematic coordination and management of budgets, personnel, organizational structure, policies concerning the use of ICTs inside the respective ministries so that the CIO Council can effectively coordinate ICT matters across the whole government including budgets, personnel, and organizational structures and so on.

The Council is also a decision making body. All the important policies of e-government initiatives in principle have to go through the Council. Thus, the CIO Council is pushing forward various measures concerning e-government in an integrated and collective manner among ministries.

Under the CIO Council, like before, the Management Committee of CIO Council and some taskforces are organized to promote the coordinated works among ministries toward e-government.

## Interministerial Committee of Assistant CIOs

Technical advisors to CIOs (Assistant CIOs) were appointed from among outside experts by December 2003 in respective ministries. Their mission is to support their ministry CIOs in business analysis and formulating optimization plans. At the same time, an interministerial committee of Assistant CIOs was organized under the CIO Council with a view to sharing experiences of respective ministries and exchanging views on technical matters; 21 meetings were held by December 2005.

## Administrative Management Bureau, Ministry of Internal Affairs and Communications

In the centre of "e-government" initiatives is located the Administrative Management Bureau, Ministry of Internal Affairs and Communications. Together with the Cabinet

Secretariat, the Bureau plays a secretariat role for the CIO Council and Inter-Ministerial Committee of Assistant CIOs and acts as a substantive promoter for e-government initiatives in Japan.

The bureau can be called a central management office. The establishment of the bureau dates back to the early 1950s when Japan regained its independence after its defeat in the World War II. The bureau has been in charge of promoting administrative reform, controlling the staff number of civil service, examining the establishment of public organizations and coordinating government information systems. In addition, the bureau has an authority to examine the annual budget requests for computer and communication systems and equipments from the individual ministries and to submit its comments to the Budget Bureau of Ministry of Finance. The comments of the bureau are seriously taken account of by the Budget Bureau during the budget preparation process. With its authorities for staff number control, organizational examination and ICT-related budget request, the bureau can effectively coordinate the government-wide undertakings for realization of e-government. Its coordination power is strong because the power is based on the laws. On the other hand, the bureau often convenes informal working sessions to exchange information, views and opinions between individual ministries. Fostering cooperative working relationship among ministries is one of the crucial conditions to smoothly and effectively implement government-wide reform measures including ICT exploitation (ECHMCA, 2001).

After the establishment of the ICT Strategy headquarters, the bureau came to carry out more innovative e-government initiatives with strong political support. It is often the case that every ministry resists to reform the current organizations and operations when the problems of current practices have not be identified. Without political commitment, the bureau can only implement reform measures after negotiation and compromise with the other ministries. The initiatives of the Headquarters are strong because the Prime Minister, Chairman, takes a strong leadership. The bureau can work out advanced reform measures with the support from the Headquarters.

## Organizational Changes in the Government

As the use of ICT for management reform has been a government-wide undertaking from 1960s, each ministry has its own unit in charge of comprehensive control of own computer and communication systems and equipments inside the ministry. The unit, often called "Data Processing Division" or "Information Management Division" plays a role of a focal point of the ministry when ICT related interministerial cooperation and coordination are to be required. The head of such division became a member of the Inter-Ministerial Committee of Computer Use. And later a supervising official of the head of the division became the member of the Inter-Ministerial Committee of Directors General on Computer Systems and currently the CIO Council.

While an interministerial coordination institution was being established, each ministry created its own ICT promotion committee to promote the use of ICT in its operation of government affairs.

After the E-Japan Strategy was adopted, an executive office was newly established in the Cabinet Secretariat and additional officials were allocated to the Administrative Management Bureau of Ministry of Internal Affairs and Communications. In the respective ministries, to deal with new jobs such as making optimization plans and strict management of ICT procurement, ICT experts from the private sector were newly appointed as officials with limited term. In addition, various business affairs such as examining the current systems and making proposals for optimization are often contracted out to a third party firm, not to the vendors of the current systems.

On the other hand, the government has been cutting down the number of civil service based on a series of staff number reduction plan. The use of ICT in government operation improves the efficiency and is regarded as one of the effective means for a smaller government. From January 2001 to March 2005, 2.2 % of the national civil service was cut down due to the efficiency gain (GOJ, 2005).

# FUTURE TRENDS

The current e-government program, "Program for Building e-Government" includes concrete measures that will have been carried out by the end of March 2006. Over the past 2 1/2 years since the program was formulated, various policy measures have been undertaken based on the program. Now, the government is in the process of evaluating the current progress and planning a new national ICT strategy to be decided in January 2006. A draft of the new strategy was released to the public on 8 December 2005. In the draft, the goal of e-government is set to realize citizen-oriented e-government in which citizen can find more convenient and high-quality services as well as to create more efficient e-government with program management offices (PMO) both for the individual ministries and for the government as a whole.

By now, some policy initiatives in the current e-government program have been accomplished, on the other hand some of them are in the process of implemen-

tation. The latter may be included in the new strategy. Major challenges to be included in the new strategy are mentioned in the following.

## To Accelerate the Use of Online Applications

While progress has been seen that 96% of the national administrative procedures are now available online, its utilization rate as a whole is rather high (more than 80%) but that of general purpose online application systems remains low so far (MIC, 2004). The current challenge is to encourage and enhance the use of general purpose online application systems by citizens and businesses. To address this issue, the following initiatives are being executed.

- An action plan for encouraging online usage is expected to be prepared for those procedures with 100,000 or more applications a year or those frequently applied for by businesses by the end of March 2006.
- "E-Government Facilitators" have been appointed from among attorneys acting as a proxy for citizens and ICT expert since April 2005 so as to improve the public awareness toward online procedures.

## To Develop and Enhance Government Portal "e-Gov"

Further works are conducted to ensure consistency in items common to "e-Gov" and ministry Web sites, including display positions on homepages. In addition, the government is working to improve "e-Gov" by extending links to the local governments, integrating reception systems developed by respective ministries.

## To Promote "One-Stop Services" through "e-Gov"

Works are under way to integrate functions of accepting on-line applications to "e-Gov" as much as possible so that One-Stop Services will be realized to accept multiple applications all at once at "e-Gov." Moreover, it is expected that an e-government customer support center will open by the end of March 2006, where citizens can get necessary instruction how to operate e-government related procedures.

## To Implement Optimization Plans

The government is now working hard on formulating all the optimization plans no later than the end of March 2006. The estimated savings in time and costs will be included in the optimization plans. From April 2006, the implementation phase of the optimization plans will be started. It is expected that this undertaking will realize streamlined public administration as well as better and more efficient public services.

# CONCLUSION

In the Japanese undertaking toward e-government, political commitment for the e-government program is not so strong but the e-government program rather serves the administrative reform to streamline the government organization and operation. After the national ICT strategy was established, the central management office could promote more aggressive reform measures by the use of ICT due to the political commitment to the strategy. The overarching organization of the e-government program is formally the ICT Strategy Headquarters but the real promoter and facilitator of e-government program is the Administrative Management Bureau. Its coordinating power is relatively strong because its has authorities of controlling staff number, examining government organizations and budget requests for computer and communication systems and equipments stipulated by the laws.

The target date of the E-Japan Strategy has passed and now a new national ICT strategy is being prepared. From 2001 to 2005, various undertakings have been carried out in the public sector as well as the private sector to better exploit ICT in the Japanese society. Inside the government, based on the e-government program, the introduction of ICT into every day operation of government affairs is aggressively carried out. Still, the civil servants tend to behave themselves unconsciously assuming that paper-based communication, coordination and management of affairs are still right. Such paper-based organizational culture may hinder the progress of e-government (Kaneko, 2001, 2004b).

To transform such organizational culture into a new culture appropriate for e-governance, fostering of ICT-based thinking and improvement of ICT literacy among the civil servants should be promoted further by making use of the expertise and knowledge of the private sector. The strong leadership of the top management is indispensable. The top management should reflect on their assumption of the existing organizational culture and take the initiative in changing the culture in the government.

Successful transfer from the present government to e-government depends primarily on human factors. E-government will be managed and administered by real flesh and blood officials. An acceptance of the changes brought about by the use of ICT in procedures and techniques

concerning government works and a positive attitude on the part of officials to the routine use of ICT will be necessary if e-government is to be successfully realized.

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## KEY TERMS

**Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (ICT Basic Law):** The law for promoting measures for the formation of an advanced ICT network society expeditiously and intensively, stipulating the basic ideas, principles and policies as well as organization for promoting measures strategically.

**E-Japan Strategy:** A medium term national strategy adopted by the ICT Strategy Headquarters in January 2001 aiming at making Japan the world's most advanced ICT nation within 5 years. The strategy shows the leading principles for preparing a priority policy program, a concrete work plan.

**E-Japan Priority Policy Program:** An action plan materializing E-Japan Strategy for each fiscal year. It includes specific and detailed measures of the individual ministries. The first program was decided by the ICT Strategy Headquarters in March 2001. It was reviewed and amended once every fiscal year since then. The latest version, the ICT Policy Package 2005, was decided in February 2005.

**Kasumigaseki WAN:** A Wide Area Network system connecting all the ministries to facilitate the safe exchange of information between them. Kasumigaseki is the name of the area in Tokyo where most of the central government offices are located. It has been operational since January 1997.

**Master Plan for Promoting Government-Wide Use of ICT:** A cabinet decision of 1994. The first 5-year plan stipulating the overall policies and enumerated concrete measures of utilizing information technologies within the Government. Revised in 1997.

**Ministerial Chief Information Officers Council (CIO Council):** An interministerial organization established in September 2002 under the ICT Strategy Headquarters. Headed by the Assistant Chief Cabinet Secretary, and comprised of all ministry CIOs (usually the Directors General of the Minister's Secretariat), it is in charge of coordinating ICT matters across the whole government as well as deciding all the important policies of e-government initiatives.

**Program for Building E-Government:** A 3-year plan decided by the CIO Council in 2003 and incorporated into the Priority Policy Program 2003. It aims at realizing user-oriented public services and streamlined public administration with high budget efficiency.

**Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (ICT Strategy Headquarters):** The Headquarters established in January 2001 based on the ICT Basic Law, headed by the Prime Minister, and composed of all the ministers of state and ten acknowledged experts from the private sector. Its main mission is to hammer out IT strategies and polices of E-Japan initiatives.

# Modern Drought Monitoring Tool for Decision Support System

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## INTRODUCTION

Drought is a natural disaster that influences many aspects of society. Since the demand for water is increasing along with the population in many parts of the world, water supply interruptions caused by drought can be expected to produce greater impacts. This is because the impacts of drought are determined not only by the frequency and intensity of meteorological drought but also by the number of people at risk and their degree of risk (Wilhite, 2000). For example, the increase in population in Africa and Asia increases drought vulnerability significantly. Thus, policies that promote the development and implementation of appropriate drought mitigation measures today will help to reduce the economic, social, and environmental impacts associated with future droughts and the need for government intervention.

To monitor drought, different types of indicators (e.g., drought indices) have been used in many parts of the world. Because there is no single definition for drought, determining which indicators to use poses more difficulties for planners. Decision makers use different policies and strategies based on the historical records of their countries. For example, in Australia, when meteorological drought (annual rainfalls in the lowest 10% of recorded values) occurred over at least 10% of the continent, it coincided with damaging agricultural droughts resulting significant losses of crops and livestock (Heathcote, 2000).

Because of the varied and potentially catastrophic losses resulting from drought in many parts of the world, both governmental and non-governmental decision makers need better predictive and monitoring tools to assist them in dealing more effectively with drought. Better early warning and prediction is the foundation of a new drought management paradigm based on risk management. In South Africa, the Weather Bureau issues extended outlooks for short and long periods using numerical modeling and statistical methods (Vogel, Lang, & Monnik, 2000). In United States, recent advances in science and technology are enhancing drought monitoring capabilities and the availability of such information, which allows decision makers to make more knowledge-based decisions to lessen the impacts of drought.

In this article, we highlight the role of government in drought planning and mitigation, the potential of data mining techniques and their outputs (e.g., maps and tables) for improving informed decision making, and also present a newly developed drought monitoring tool, the Vegetation Drought Response Index (VegDRI) as an example over the central United States.

## BACKGROUND

Recurrent droughts and their significant impacts on societies are increasingly forcing governments to play a more significant role in drought management in many parts of

the world. Given the complexity of drought, where the impacts can accumulate gradually over time and vary widely across many sectors, a well-designed decision support system is critical to effectively manage drought mitigation and response efforts (Goddard, Harms, Reichenbach, Tadesse, & Waltman, 2003). The traditional mindset of government in the United States and elsewhere has been to react to drought (i.e., crisis management approach) through the provision of relief or emergency assistance to the affected areas or sectors. With this approach, drought only receives the attention of decision makers when it is at peak levels of intensity and spatial extent and when water management options are quite limited. This approach has been characterized as ineffective, poorly coordinated, and untimely (Riebsame, Changnon, & Karl, 1991; Wilhite, 2000; Wilhite & Wood, 1994). Not only is this approach extremely costly, relief provided through this process is often politically driven, programmatically misdirected, and poorly targeted. Relief often serves as a disincentive for the sustainable management of natural resources because it reinforces existing management practices, practices that may not be sustainable in the long term. This reactive approach is not good policy and must be replaced by an anticipatory, preventive approach that reduces risk through the adoption of appropriate mitigation programs and policies (e.g., risk management approach). Today, nations are increasingly pursuing a more proactive approach that emphasizes the principle of risk management and sustainable development (Wilhite, 2000).

Technological advances and better use of available drought monitoring tools improves our ability to more effectively manage water and other shared natural resources during periods of drought. These changes can facilitate the shift to risk management because they allow governments on the national, state, and local level to address some of the more serious deficiencies of the crisis management approach. For example, our ability to monitor and disseminate critical drought-related information has been enhanced by new technologies such as automated weather stations, satellites, computers, and improved communication techniques (e.g., the Internet).

Previous drought planning efforts have been hampered by a lack of adequate early warning systems and insufficient information flow within and between levels of government. However, an improved understanding of complex atmospheric-oceanic systems and the development of new computer models have improved drought forecast skills for some regions. If they become part of a comprehensive early warning system, these advancements and others can provide decision makers with better and timely information. One of the recently developed techniques relevant for such drought monitoring and prediction is data mining.

## THE USE OF DATA MINING TECHNOLOGIES IN IDENTIFYING DROUGHT

Data mining is a technique that uses a variety of data analysis tools to discover meaningful patterns and relationships of physical variables in different data sets (Berry & Linoff, 2000; Han & Kamber, 2001; Two Crows, 1999). This technique is used in multidisciplinary fields, bringing together techniques from machine learning, pattern recognition, statistics, databases, and visualization to address the issue of information extraction from large databases (Cabena, Stadler, Verhees, & Zanasi, 1998). The method has been used for commercial applications to increase profits (Cabena et al., 1998; Groth, 1998). These techniques are being utilized more frequently to extract hidden relationships and information from large databases to allow managers to make knowledge-based decisions (Berry & Linoff, 2000).

Data mining can also provide mechanisms for resourceful and efficient data handling and extraction of information in drought research. This is extremely important because monitoring and prediction of drought relies heavily on the use of climatic, oceanic, satellite, and biophysical data. At present, extracting useful information from these data and producing drought monitoring tools hold many challenges. Data mining techniques such as association rules, decision trees, and neural networks can help in finding a relationship among meteorological, satellite, oceanic, and biophysical variables.

Recent studies have applied data mining techniques to understanding drought characteristics in the central United States (Harms, Deogun, & Tadesse, 2002; Tadesse, Wilhite, Harms, Hayes, & Goddard, 2004). Harms et al. (2002) developed data mining algorithms that identify the drought episodes separate from normal and wet conditions. The algorithms generate association rules defined as "if X then Y," where X is the rule antecedent and Y is its consequent. Tadesse et al. (2004) used this rule-based association technique with the global oceanic indices as antecedent episodes and drought as consequent episode to find the relationships between climatic and oceanic parameters within the state of Nebraska. This study indicates that there is a strong relationship between the global oceanic condition and drought occurrence in Nebraska. This information is important in helping to predict future drought occurrences. Studies in ecological research have also introduced data mining techniques and found that they are powerful tools to address complex ecological problems involving both numeric and categorical data (De'ath & Fabricius, 2000).

In another drought monitoring research study, Brown, Tadesse, Hayes, and Reed (2005) focused on simple

predictive modeling of drought using a combination of seasonal satellite vegetation metrics and climate and geophysical variables. In order to extract patterns from these variables, they used a data mining technique known as regression tree modeling to develop models to monitor drought during the growing season. These rule-based models are collections of rules, each of which is associated with a linear expression for computing a value called the Vegetation Drought Response Index (VegDRI), which is used to identify drought conditions. The VegDRI provides a unique and detailed source for monitoring drought conditions over natural and anthropogenic landscapes. Tadesse et al. (2005) expanded the study to predict future drought conditions (based on vegetation stress) by integrating data mining and satellite image processing techniques to assess vegetation conditions. The study indicated that drought information for vegetation stress can be delivered up to six weeks in advance and in a finer spatial detail (1 $km^2$) than other widely used drought monitoring maps such as the U.S. Drought Monitor map (http://www.drought.unl.edu/dm/), which uses climate division data with roughly a 100 $km^2$ spatial resolution.

In general, the results of studies on the application of data mining in drought research show that:

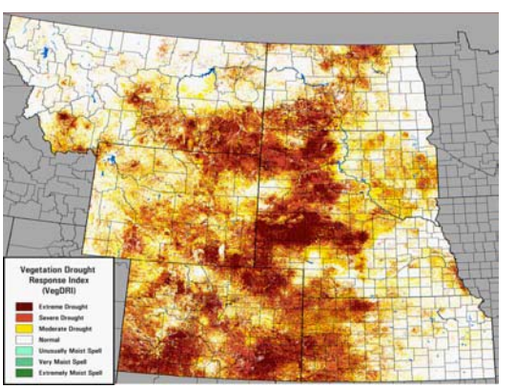
1. Because of synergy between data mining techniques, faster computing capability, open access to data, and integration of data provided in large databases, we can answer questions that traditionally were too complex and time-consuming to resolve
2. Data mining tools search databases for hidden patterns and find predictive information that drought experts may miss because it lies outside their expectations
3. Data mining techniques are fruitful for business activities such as marketing, fraud detection, and credit scoring. In drought research, these techniques have only recently been utilized and have tremendous potential
4. Data mining helps in exploring and discovering the relationships between ground-based climatic observations and oceanic observations to enable better understanding of causes and effects as they pertain to drought. Using time-series of these variables allows for identification of the temporal relationships of the climatic and oceanic variables and how they tie into the current and future presence of drought. This is useful for improving drought monitoring capabilities and for developing proactive drought risk management practices
5. Current developments and trends in drought research using data mining techniques can help people and institutions develop and implement methods to reduce societal vulnerability to drought. This supports the effort that is necessary in governments toward preparedness, early warning, and risk management, rather than crisis management. It will also assist in the design and development of an integrated and automated system for drought monitoring and prediction that can be adapted for use by a variety of decision makers and users

To illustrate the potential of data mining and its application in drought research, the following section describes prototype drought monitoring tools that are produced using data mining techniques in the central United States.

## INTEGRATING SATELLITE AND CLIMATE DATA TO IDENTIFY DROUGHT: AN EXAMPLE IN THE CENTRAL UNITED STATES

A collaborative effort between the National Drought Mitigation Center (NDMC), the High Plains Regional Climate Center (HPRCC), and the U.S. Geological Survey's EROS Data Center (EDC) is underway to develop and deliver geospatial information about drought in the central United States. In this project, a prototype drought monitoring system that integrates information from climate and satellite databases using data mining techniques is developed (Brown & Tadesse, 2003). Data mining based on a classification and regression tree (CART) technique was used to model drought using climatic data, biophysical data, and a satellite-derived vegetation index. Since 2002, this research has investigated the relationships between climate data and satellite-derived greenness information for monitoring the effects of drought on vegetation. Figure 1 shows an

*Figure 1. Vegetation Drought Response Index (VegDRI) map of central U.S. for July 25, 2002*



example of a product from this collaborative research that is used as an indicator of drought-affected vegetation for seven states in the north central United States.

This product has a resolution of 1 $km^2$, which provides a detailed map of the vegetation stress due to drought. This means that the VegDRI contains sub-county detail that cannot be found in existing climate-based drought maps. The information can also be organized with other information such as land cover in a layer using geographic information system (GIS) software. The combination of the land cover and VegDRI map allows for an areal assessment of drought impacts on different landscapes. Such GIS layers (maps) can be disseminated to the public using a Web-delivery system for any state or region.

A prototype drought monitoring Web delivery system is available at http://gisdata.usgs.net/website/Drought_Monitoring/. This interactive Web mapping application was developed by USGS to support visualization of drought information (e.g., VegDRI maps). The map viewer includes other layers such as satellite-derived vegetation greenness data, climate data, biophysical data (e.g., land cover), and digital elevation data that may provide relevant geospatial information for decision makers. Such Web delivery provides large amounts of information efficiently and rapidly to interested users.

Feedback from potential users of the new drought monitoring tools, such as VegDRI, is an important mechanism to improve the product and the delivery system. To this end, two workshops were held with potential users of VegDRI in South Dakota and Nebraska. These discussions identified a wide range of potential applications for the product. State and federal agricultural agencies cited the potential use of VegDRI in helping to verify drought disaster claims on range and croplands and in making other rangeland and forestry management decisions. For example, federal managers responsible for determining appropriate livestock grazing numbers on federal lease lands could use VegDRI maps to help decision making. Forestry personnel recognized the potential value of VegDRI in fire planning efforts such as scheduling prescribed burns and identifying high-risk fire areas. Similarly, individual producers also identified the potential use of VegDRI maps for filing disaster insurance claims and making farm marketing decisions. Finally, environmental management agencies noted the benefits of VegDRI for monitoring wildlife habitat quality. The availability of this and other new drought monitoring tools with relevant geospatial data enables a wide range of decision makers to act timely and efficiently to reduce the impacts of drought. National and international disaster assistance and relief organizations and government institutions can benefit from fast and user-friendly delivery of information for effective planning and management of available resources.

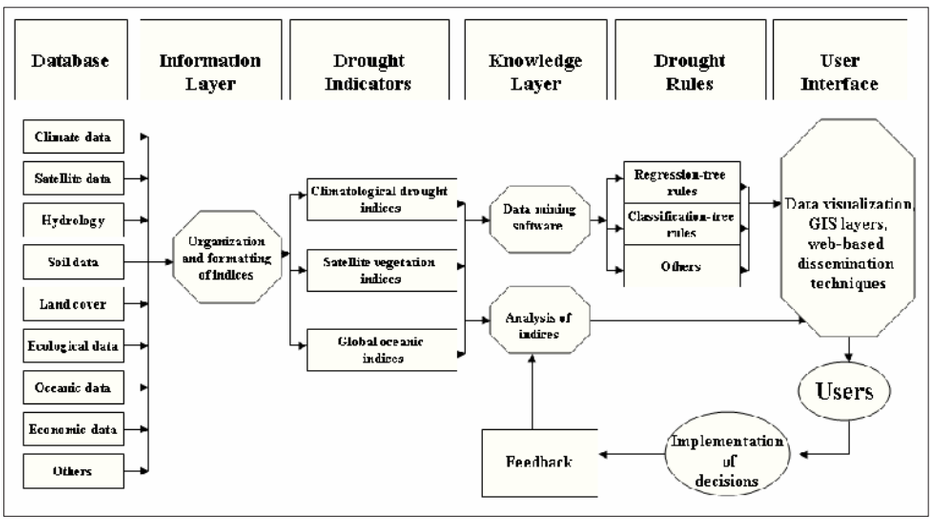
## FUTURE TRENDS: INTEGRATED INFORMATION FOR DROUGHT MONITORING IN DECISION MAKING

The use of data mining technology is increasing in drought monitoring research. Many drought studies have focused on the frequency, intensity, and spatial extent of drought in a state or region. However, the complex characteristics of drought and its infrequent nature as compared to both normal and wet conditions in climatic time-series data requires the development of specifically designed data mining algorithms. For example, a hydrological drought that depends not only on seasonal precipitation but also surface and ground water levels may need a different approach and tailored models than an agricultural drought. Such specific drought models may need to be developed to assist specific societal sectors in managing drought in the future.

The VegDRI model is designed to monitor vegetation response to drought. The successful implementation of the VegDRI monitoring technique in the central United States, along with increasing technological improvements, may provide an opportunity to extend the application of these methods and tools across the United States and abroad. Despite such innovations, the development of new techniques and drought monitoring tools is not the only part of a decision support system. An integrated and systematic approach in using modern tools is of paramount importance in decision making. Thus, a comprehensive decision support system for drought monitoring is an important factor that should be developed and implemented if governments plan to meet the challenge of mitigating the impacts of drought.

Figure 2 shows a hypothetical approach for an efficient, proactive drought decision support system. In this flow chart, the database is built in a data warehouse containing many relevant variables. The next step is the information layer that computes the drought indices. From an operational point of view, it is important to identify each type of drought using its triggering mechanisms. Thus, drought indices for each type of drought (for example, agricultural drought) should be calculated. It may be important to compare and contrast the values of each index and make verifications with ancillary data. Data mining techniques are applied to find the relationships between parameters that are useful in making improved analyses of drought based on the patterns derived from the data. After the analysis of the outputs and trends, the results need to be organized and expressed in an easily understandable format using data visualization and GIS techniques. The information can be disseminated using a Web-delivery system that may be easily accessed by decision makers, government and non-governmental in-

*Figure 2. Hypothetical flow chart for a proactive drought decision support system*




stitutions, and individual users such as farmers and ranchers. Finally, the outputs can be used to make logical decisions. In the figure, the loop that indicates the feedbacks in comparing and verifying the outputs is essential for improving drought monitoring tools and decisions. The rules generated using data mining techniques are part of the decision support system that is described in the hypothetical flow chart to improve drought monitoring. Moreover, governments should have a systematic approach for assessing the vulnerability of key sectors, regions, and population groups in the country and in their potential actions to mitigate those impacts.

Rapid development in the information and communication technologies has progressively moved toward fast and efficient access to data and information. The use of these technologies is invaluable in helping to mitigate droughts and their impacts on the economic development of a society. Thus, it can contribute in the e-government world by expanding the use of the Internet and computer resources to provide government services in effective management, reducing impacts, and efficient planning of early warning systems for natural disasters such as drought.

## CONCLUSION

To reduce the impacts of drought, governments need to have or develop a sustainable drought mitigation and response plan that includes timely and reliable monitoring of drought and water supply conditions. An integrated approach to drought monitoring that incorporates information on the vulnerability of key sectors, regions, and population groups in the country enhances the effectiveness of actions that may be taken to mitigate the impacts of drought in the future. The government should also assist the stakeholders in preparing for and responding to drought impacts, including the development of a water conservation strategy and public awareness programs.

Modern drought monitoring tools have the potential to reduce drought impacts significantly because of their flexibility (adaptability) and relatively higher spatial resolution (e.g., VegDRI has 1 $km^2$ resolution). Drought maps and prediction products using data mining tools could be made available to decision makers in any state or region through Web delivery. The use of data mining techniques is expected to enhance the efficiency and accuracy of drought monitoring, especially in agricultural and water resources management.

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## KEY TERMS

**Biophysical Parameters:** Measure of the biophysical conditions that may influence the vegetation response to climate variability, such as land cover, ecological land type, percent of land in farms in irrigation, and available water capacity of soil data.

**Climatic Drought Indices:** Indices based on climatic observations such as precipitation and temperature. These include the Palmer Drought Severity Index (PDSI) and Standardized Precipitation Index (SPI). The SPI was designed to quantify the precipitation deficit for any location (for example, a weather station) based on the long-term precipitation records for a desired time interval. The SPI calculates the precipitation deficit for specified time periods (e.g., in the past one month, three months, six months, nine months, and twelve months.) The PDSI is an index that represents the soil moisture departure for a region by implementing a simple supply-and-demand model for a water balance equation. Thus, the PDSI value is an indicator of how the soil moisture compares with normal conditions. The PDSI is calculated based on parameters including precipitation, temperature, and soil moisture conditions.

**Data Mining:** A technique that uses a variety of automatic or semi-automatic data analysis tools to discover meaningful patterns and relationships of physical variables in different data sets that can also be used for prediction.

**Drought Decision Support System:** A system that provides support to the group or individual decision making process with tools that facilitate organization, prioritization, and consensus development to perform a variety of tasks associated with assessing risk and efficient action to reduce and mitigate the impacts of drought.

**Drought Monitoring Tools:** Tools in the form of maps or tables that include various kinds of climatic, satellite,

and oceanic indices to indicate or predict drought condition. These tools can be disseminated via the Internet to monitor drought.

**Oceanic Indices:** Indices that show the global oceanic condition, such as Sea Surface Temperature (SST) variability of the Pacific Ocean. The indices include the North Atlantic Oscillation (NAO) Index, which is defined as the normalized pressure difference between a station on the Azores and one on Iceland; the Pacific Decadal Oscillation (PDO) Index, defined as the leading principal component of North Pacific monthly sea surface temperature variability; and the Southern Oscillation Index (SOI), computed using monthly mean sea level pressure anomalies at Tahiti, French Polynesia; and Darwin, Australia.

**Satellite Indices:** Indices that show the water stress or vegetation condition based on the satellite data. The indices include the Normalized Difference Vegetation Index (NDVI), which is based on the response of vegetation in visible and infrared channels of the satellite.

**Vegetation Drought Response Index (VegDRI):** This index is built on the model integrating the satellite and climate data that indicates the impact of drought on vegetation. The VegDRI is calculated using data mining techniques that integrate complex information from satellite measurements, climate-based drought indices, land cover types, soil characteristics, and additional environmental factors such as ecological type and percent of irrigated lands in farms. These VegDRI maps deliver continuous spatial coverage, and are inherently finer in spatial detail (1 $km^2$ resolution) than other commonly available drought indicators such as the U.S. Drought Monitor.

# Monitoring Technologies and Digital Governance



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## INTRODUCTION

Digital government is a technological adventure. It applies new technologies—in particular, computer-mediated communication—to the ongoing development of democratic forms of government. While the primary focus in digital government literature is on computer-mediated politics and formal governance, these technologies have wider effects. Generally, new information technologies enable new forms of control (see Beniger, 1986, for an excellent history and the general connections between information, control, and governance). The technological changes that make digital government an option alter the possibilities of governance at all levels. Driven by the declining price of computer hardware (so-called Moore's law) sensors (e.g., cameras, RFID tags), computers and networking make it possible to find out about and to control many hithertofore uncontrolled aspects of our lives. This article considers the effect of new monitoring technologies in the broad sense introduced by McDonald (2001) as inclusive of the range of control mechanisms—personal, informal, social, market, legal, and political—that we deploy.

In general, we expect technological innovation to create ethical problems. Innovations move communities from technological and social situations for which their norms are well adapted to new situations in which the fit tends to be worse (Binmore, 2004). Even seemingly small changes in technology, especially communications and monitoring technology, produce significant stress on norms. (Consider how cell phones and then cell phone cameras challenge norms governing privacy in public spaces.) Therefore, we should expect moves toward digital government to face ethical problems. This article considers problems due to a suite of monitoring and surveillance technologies that promises significant benefits but raises issues in terms of the values of control, privacy, and accountability.

## BACKGROUND

We need to remember how new the ensemble of monitoring technologies is. Gelernter's (1991) seminal proposal to build a mirrorworld allowing citizens to examine many aspects of their local government and healthcare system in real time seemed wildly utopian when published in the early 1990s. Now, the Internet has become so integrated into everyday life in rich countries that schoolchildren are surprised that some books are not available online.

This article suggests that we should consider a wide range of examples in order to form our evaluation of monitoring technologies. Our approach contrasts with what is favored in the sociological and popular literature critical of technology, much of which focuses on two metaphors: Orwell's (1949) Big Brother and Foucault's (1977) account of Bentham's (1969) panopticon prison design (Lyon, 1994; Mann, Nolan, & Wellman, 2003; Rheingold, 2003). Both metaphors suggest that more monitoring technology means stronger governance in the sense of tighter control. However, as we shall see, it is not clear that introducing surveillance in some contexts (we will consider the case of the clinical consulting room) has these unidirectional effects. Rather than trying to coin less misleading metaphors, it seems better to engage in an informal technological survey, forecast, and risk assessment. We will consider selected cases of new monitoring technology, sketching how each changes the players, options, strategies, social norms, and outcomes in social situations and using what we call an informal strategic approach (Danielson, 2005). Indeed, merely surveying some of the myriad new monitoring technologies currently available should be educational, as most of them have a low public profile.

To draw on a particularly significant example, the number of video cameras used for surveillance has increased enormously. Much of the public space in London is under government video surveillance, and the estimated 200,000 cameras in Shanghai are planned to double by 2010 (Epstein, 2004). The Chinese example makes two additional points. First, as the world's leading non-democratic state, China raises the question of the role of democracy in digital government. We face a terminological choice. On the one hand, digital government could be given a neutral interpretation related only to efficient governance of whatever kind. On this reading, effective (but non-democratic) digital government would include China's use of video or network surveillance to monitor

and suppress political dissent (Walton, 2004). This article will follow the alternative convention, under which digital government assumes democratic goals. (The clearer term for this value-driven approach is *digital democracy*.) Similarly, we shall use the term *governance* with a normative bias, looking for ways to improve self-control and legitimate governance, for example, and not manipulation or tyranny.

Second, Epstein (2004) reminds us that by turning to surveillance cameras, China deploys modern technology to perform a job that, under Mao Zedong, was largely society's responsibility. This brings us to a recurring theme: technology may not simply introduce or increase governance, but it may shift the balance between various controlling mechanisms and parties.

While surveillance is timely, relevant, and obviously controversial, we will not begin our account with surveillance for several reasons. First, surveillance technologies are unique in their strategic functions. Often, they gain much of their power by revealing themselves to their subjects; think of all those signs announcing hidden cameras. (This is the shared truth in the Big Brother and panopticon metaphors.) Truly invisible surveillance cannot deter people as readily as more obvious surveillance. Therefore, surveillance understates one of the main problems with new monitoring technologies in a democracy—their generally unnoticed role. This leads to the second, more general reason to put off discussing surveillance: it is very complex. In this article, we use *monitoring* to include surveillance (see Danielson and McQuade [2005] for a more nuanced account).

We select our examples with three goals: (1) to cover a wide range of emerging technologies; (2) to use technologies embedded in varied social relationships, institutions, and cultures; and (3) to start with the simpler case of physical things, move to non-human animals, and end with persons. In effect, we will try to apply a simple Kantian model that ranks ethical significance as least for things and as most for persons. As we shall see, technological change will not respect this ethical scheme.

## NEW MONITORING TECHNOLOGIES

### Things

The technologies under consideration change ordinary objects like books, commodities in stores, cell phones, and cars in a characteristic way: they become easier to monitor. They cease to be isolated and become linked to a communications system, where they can be stored in a private database (at minimum) and perhaps even addressed and interrogated. These are forms of dataveillance, whereby things become linked to records in large databases. For example, UPC scanning allows shops to use customers to help to maintain inventory. Loyalty cards go further, linking products via their purchasers into purchasing histories that retailers use for planning or for selling to third parties.

This technology changes individuals' strategic situations; we should be asking who is scanning our purchases and transit tickets, which is a question most of us previously needed to ask only about our credit cards, identity papers, or driver's licenses. Unless people understand which personal information is being read or exchanged, their participation in transactions is unlikely to be fair. Perhaps introducing some new terms that are common in writing in this field will alert us to think of more things that are now part of an infosphere with an infocloud surrounding them. Or, in time, we may generalize from our experience with card and UPC scanners in shops and other venues. The Internet, which began as a research platform, continues to play that role. Several ongoing experiments help us to envision what we might expect from a developed infosphere that includes many of the objects we use every day. An example is the Microsoft Research Advanced User Resource Annotation (AURA) system, whose motto is "Annotate the Planet!" and which allows people to link products to arbitrary Web pages via their product identifiers.

### Books and Barcodes

Books are a good place to start. They are familiar, full of information, and traditionally quite local and inert. That is to say, one can walk past the shelves in a library knowing that there is a great deal of information in the books but needing to take each one down and actually read it in order to find out it. Even then, one won't readily find out if one has already read it (and when), who else has read it, where it was reviewed, and how the reviewers rated it. Second, each book is created with a unique identity (the ISBN) that it wears on its barcode. This is the link between the traditional book and books enhanced with an infosphere. Readily available open-source software allows one to surf the infosphere of books by scanning their barcodes.

Barcoding can support various follow-up technologies. Some stores currently supply terminals that allow customers to check prices via barcodes. Local wireless networking would allow an allergy meter to alert a consumer with Internet-based information to avoid any of an open-ended list of allergens or any other features that they (or their agents) programmed into it. Projecting into the near future, one can imagine a multi-factor value analysis output: no serious allergy alert, mediocre nutrition, good environment, excellent price, personal use history, and so forth.

### Boxes and RFID

Radio frequency identification (RFID) is a technology that uses radio waves to read information from a tag. Compared to barcodes, RFID allows sensing at a greater distance and the ability to tag non-manufactured items. The first feature allows RFID tagging to enable sophisticated inventory tracking systems, and as the price of RFID tags drops, these tags, required by logistically advanced organizations like Wal-Mart for large packing cases, will be found in packages of decreasing size and in consumer products. RFID tags in clothing are the most controversial, since they would expose the wearer to personal monitoring.

## Food and Animals

The use of RFID and other tags in food and animals raises additional issues. First, some of this tagged information needs to be authoritative. Allergic and dietary contents already are required fields on limited printed physical labels; prices need to be fixed locally by the store (owner). But even these fields likely will be augmented by other non-authorative and critical contributors. Consider the debates about the allergenic risks of transgenics (Expert Panel on the Future of Food Biotechnology, 2001) and the relative risk/value of (anti)nutrients like transfats and bovine growth hormone, respectively. Enhanced labels become sites for ethical and political disagreement.

Notice that expanding labels using the Internet as discussed previously with AURA resolves two related objections to expanding consent via labeling controversial foods. First, limited space on mandatory product labels is no longer a problem, once barcodes are linked to whole Web sites. Second, competing non-scientific claims about health and safety no longer need be adjudicated by the labeling authority. Like book and movie reviews, there is space on the Internet for diverse views to be heard.

RFID tags have been implanted in living animals, beginning with valued pets and moving to livestock, which can be tracked to control BSE and tuberculosis. Human tagging was approved by the U.S. Food and Drug Administration in October 2004 for medical records but has been used already by Mexican government officials for security purposes (Sullivan, 2004).

## Persons

### Surveillance

In spite of the growth of video surveillance and its prominence in the literature, the focus on government surveillance cameras may miss rapid change in the surveillance environment. Lyon (1994) makes several important distinctions between modern surveillance and the Big Brother model fostered by the prominence of Orwell's (1949) novel, *1984*. First, modern technology supports dataveillance vs. video surveillance. As the old saying reminds us, pictures are much more complex than words or, more yet, numbers. Accordingly, it is much easier to survey, sort, and classify high-level data such as bank records or e-mails than it is to view photos or videos. Digital video techniques such as face recognition blur this distinction.

Second, as costs decline, the technology becomes decentralized. Much modern surveillance is conducted by small businesses or private individuals. The highly influential videos of the Rodney King beating and photos from the Abu Ghraib prison illustrate the power of digital technology dispersed among individuals, which Mann et al. (2003) label *sousveillance*. Cell phone cameras are an extreme example of this trend. While many have noted that in 2004 digital cameras (69m units) outsold film cameras (47m units), perhaps more significantly, both together were surpassed by a relatively new invention—the cell phone camera (186m units) (Move Over, Big Brother, 2004). Although digital and cell phone cameras both gain from easier networking, cell phone cameras are automatically wirelessly networked.

Third, modern surveillance is often non-governmental. Indeed, as the two previous examples show, it is often a countervailing influence to government attempts to monopolize information.

### A Micro-Case: The Virtual Chaperon

Monitoring technology adds more information and facilitates forms of access and control. The political case is quite complex. The sources (public, corporate, and private) of surveillance data are quite varied as are the parties—the publics—who might gain access or control over access to these sources. In order to understand the problems and opportunities offered by newly feasible surveillance technologies, we propose to examine a small micro-case. The Virtual Chaperone, developed at the Imperial College School of Medicine in London, videotapes a clinical encounter and encrypts the record immediately to DVD, providing the patient and the provider with an authoritative record (Clark, Bann, Edwards & Darzi, 2003).

The Virtual Chaperone has been developed in nearly ideal circumstances from an ethical perspective. The Virtual Chaperone was designed to meet and to raise the standards of clinical bioethics, the most highly developed form of professional ethics. The Virtual Chaperone suggests the complex relationship between surveillance and ethics. On the one hand, fully trustworthy agents do

not need chaperones; they do not grope patients or fabricate claims of abuse. Real agents are not perfect, so they need supervision. But ethics is not simply supplanted by technology. The need for and the right to privacy that led originally to private medical examinations speak even more strongly for protecting videos of intimate examinations. So, additional technologies—encryption and access, in this case—are needed in order to support a thorough solution. The Virtual Chaperone also shows that surveillance need not simply extend power relations, as Foucault's (1977) many students insist. The device's developers claim that both parties feel mutually protected. This needs to be tested and critically examined, of course. But elementary strategic considerations suggest that a reduction in uncertainty and lower litigation costs are beneficial to both parties (Big Sister Is Watching You, 2004).

Inexpensive miniature video sensors, processors, and memory let the Virtual Chaperone be generalized to a personal black box for everyone, but especially seniors with failing memory. "The type of scenarios which originally motivated SenseCam center on personal memory recall. For example, where did I leave my spectacles or keys? ... All the exciting events (and falls measured by accelerometer and so images of which were captured) can be replayed by mother after she gets home. What happened to me? If one is cycling and falls injured by the side of the road, the emergency medics can review the data in the SenseCam … and give appropriate medical treatment" (Gemmell, Williams, Wood, Lueder, & Bell, 2004, p. 2). However, moving this technology out of the ethically constrained clinic raises many issues. For example, who gets access to the cyclist's data after an accident? These issues have been played out in another venue.

## Cars and Black Boxes

Most cars manufactured by General Motors and those increasingly manufactured by Ford contain event data recorders (EDR), the automotive equivalent of the black boxes (actually, orange boxes) long used in airplanes and ships. This technology focuses attention on who owns or otherwise controls the information collected in a contentious context in which the players, drivers, manufacturers, and government have different interests. We suggest that *black box* really is the appropriate term, as presently it is very difficult for the driver/owner to get at the information stored inside, and thus, control is very difficult. "General Motors has not released the information necessary to directly confirm or translate the raw data" from its event data recorders (Poplin, 2003).

Again, the personal case is at the simple end of the spectrum. While black boxes have been used for years in shipping and aviation, their introduction into private automobiles has been much more controversial. This may be due to the strategic environment. In cars, the recorders were introduced at the initiative of the manufacturers in order to protect them from legal claims that safety equipment failed by showing that the airbags functioned or that speed was excessive. Moreover, the recorders put owners/drivers at additional legal risks. In contrast, the owner of a truck fleet may use recorders strategically to solve a principle agent problem with drivers, but the owner's interest in the technology is straightforward.

## Patient, Genomic, and Other Information

Like surveillance, clinical medical records and genomic information present extremes of information that is easy to divulge (a single hair follicle suffices for the latter) but very risky, since individuals can lose control; individuals risk loss of jobs, health insurance, and social stigma (Kitcher, 1996). Information technology plays a large role in the genomic revolution (Moor, 1999), in particular, enabling the field of bioinformatics with its need for large databases matching clinical, genomic, and environmental data.

Remarkably, this has led to results of genomics appearing on the Web for public use. For example, about half of the visits to the Toronto Children's Hospital Chromosome 7 site (http://www.chr7.org) are from ordinary people (Sherer, 2004). Notice that this bypasses official gatekeepers of genetic information; namely, genetic counselors, so that it not only raises issues of biomedical ethics but changes the politics of genomic medicine. Also, such sites help disorder advocacy groups to form, changing the large-scale politics of health care. The previously mentioned site has a For Families page listing research and support groups (see Stockdale and Terry [2002] and the interesting site of the U.S. National Organization for Rare Disorders [http://www.rarediseases.org] discussed there).

Notice, as well, that network technology raises questions about what it means for something to be public. The information on the Chromosome 7 Annotation Project is from published scientific sources. Therefore, the collators can say that they only are easing access to already public data. However, this overlooks the practical obscurity of physical access to inaccessible scientific papers.

## Calendars and the Information Commons

Again, we may learn by looking at less charged examples. Take the example of group calendaring, which is easy to implement in an environment of networked computers but, as it turns out, very difficult to achieve. That is, while

many of us use personal computers, personal digital assistants, or cell phones to plan our personal calendars, and although most of these devices intercommunicate, most of us do not share our calendars in our workgroups. This has been plausibly explained by users' strategic motivations. "The group calendaring value of electronic calendaring is lost unless everyone cooperates. People do not have an incentive to maintain their calendars in such a way that they support group use" (Bullen & Bennett, 1991, p. 271). Here is a basic problem overlooked by schemes like Gelernter's (1991) that envision wide-scale sharing of personal information. Any information sharing imposes some cost; in addition, medical, financial, religious, and political information poses serious risks. The benefits come mainly from others sharing their information. This makes sharing information a version of the tragedy of the commons (Hardin, 1968). Privacy rights do not speak directly to this problem, which shows that we will need to work on new questions of motivation as we move to implement large-scale social information sharing like that which is required by genomic health care.

## FUTURE TRENDS

What general lessons can we learn, given the likelihood that technological change will present challenges entirely unforeseen in this article? Three features make the ensemble of monitoring technologies problematic for the future:

1. Moore's law applies to sensors and communication technology as well as to computers, so we can predict confidently that new problems will be presented by monitoring technologies. Sensors will become smaller, cheaper, and easier to network and to hide.
2. These technological changes will not respect existing moral or regulatory categories. The economics of integrated circuit-chip-based technology means that technologies like RFID or GPS become cheap across the board, so they are likely to generate all sorts of new, unexpected uses. In addition, the drivers of technological change are uneven. It is surprising that RFID chips already are placed in people before we have had a chance to get used to them (i.e., adjust our norms on less vital applications) in books, cartons, or food. GPS was introduced in automobiles to track rental units. Then, parents began using it to track young drivers.
3. Most monitoring technologies have not developed in ethically rich environments. As noted, bioethics has shown itself capable of developing and putting into practice sophisticated evaluations of emerging health care technologies, including monitoring technologies. In contrast, many monitoring technologies (the extreme are covert technologies such as Nanny Cams) have developed outside of critical oversight and institutional governance.

## CONCLUSION

We collect our suggestions as a set of recommendations:

1. **Awareness:** It is useful to know that a monitoring or surveillance device is in use at a particular location on in a particular device. This recommendation ranges from cell phone cameras that make a mandatory noise (as required in Korea) or flash to surveillance cameras that emit an infrared beacon. This leads to greater accountability.
2. **Transparency:** It is useful to be able to read the data (e.g., with a credit report). Many technologies conflict with this principle: transit tickets with tracking magnetic stripes, surveillance cameras in commercial and pubic locations, and supermarket loyalty cards. We recommend that all users of these technologies provide simple ways for their subjects to read or see the data involved.
3. **Control:** It is useful to be able to control one's data in order to enable negotiations over use. As new users adopt technologies, a particular problem is bad default settings, which leave monitoring devices open to unsuspected access. The unanticipated growth of sophisticated search engines intensifies this loss of control. For example, searching with Google on the string inurl:"ViewerFrame?Mode=" finds unprotected security cameras a year after the problem was uncovered (Poulsen, 2005).
4. **Openendedness:** We can overemphasize the risks to privacy posed by these technologies. Open data can be useful in ways in which it is difficult to anticipate. We have mentioned possibilities of labeling and reviewing items by linking alternative sources of data to tags, as has been done for UPC barcodes by the AURA system discussed previously. GoogleMaps and the publication of genomics data are serious current examples.

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## KEY TERMS

**Big Brother:** Orwell's (1949) fictional depiction of a totalitarian state employing two-way television for constant surveillance gave rise to this metaphor for the surveillance state.

**Black Box:** Event data recorders (EDRs), which are found in aircraft, in ships, and increasingly in automobiles, store a record of inputs on speed, orientation, engine settings, and impact in a form recoverable after a serious accident.

**Dataveillance:** The systematic use of personal data systems in the investigation or monitoring of the actions or communications of one or more persons (Clark, 1988).

**Global Positioning System (GPS):** Devices that establish location within meters by means of satellite-based radio triangulation.

**International Standard Book Number (ISBN):** A unique identifier for books designed for commerce. Periodicals are marked with the similar ISSN (International Standard Serial Number).

**Monitoring:** The systematic observation of things, places, processes, or persons.

**Moore's Law:** The empirical observation attributed to a co-founder of Intel that the complexity of integrated circuits doubles every 18 months.

**Panopticon:** A technologically advanced prison in 1787 introduced by Bentham (1969) and developed by Foucault (1977) as a metaphor for surveillance.

**Radio Frequency Identification (RFID):** A technology that uses radio waves to read information from a tag.

**Surveillance:** The targeted monitoring of persons for evidence of crime or other sanctioned behavior.

**Universal Product Code (UPC):** The original numerical barcode used on commercial products, typically read by a laser scanner on point-of-sale terminals.

# Natural Resource Information Management at State Government Level

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## INTRODUCTION

Spatial information management (SIM), which includes utilization of geographical information systems (GIS), is used in a wide variety of information resource applications.

GIS applications have been able to make use of the extraordinary expansion in available data from remote sensing operations such as satellite imagery. SIM has been able to build upon these systems using software support for spatial databases and interactive mapping applications. Private sector applications tend to be specific to sectors of interest, whereas public sector systems have wide application across sectors.

The information management that is applied has a technical dimension facilitated by GIS. It also has analytical and strategic dimensions that require detailed investigation and planning for the corporate context in which the SIM is undertaken.

This contribution provides a brief overview of some of the contextual influences on SIM, and then details a case study of a particular application to natural resource information management in a government department.

## NATURAL RESOURCES APPLICATIONS: BACKGROUND

### Standards and Coordination

Governments have been concerned to coordinate information within national frameworks that can be applied at local levels. For example, in Australia and New Zealand, there is the Australia New Zealand Land Information Council (ANZLIC) that manages a national strategy for land and geographic information. In Australia's case this is directed towards an Australian Spatial Data Infrastructure (ASDI) operating at federal and state level (ANZLIC, 2004).

ASDI aspires to foster a distributed data network incorporating validated core data sets with associated products and services to support economic, ecological, and social development. Its agenda is also to ensure archiving of data for future use, avoid duplication of datasets, and provide best practice quality assurance.

Included among the guidance provided by ANZLIC is an information management toolkit (National Land and Water Resources Audit & ANZLIC, 2003). This toolkit, among other things outlines data management principles; compliance; approaches to interpretation and visualization of data; data discovery and access; guidelines for software selection; map production; global positioning systems (GPS) practice and guidelines; and project management.

The national frameworks in turn may be responsive to international efforts in the same direction. For example, the large number of datasets of different types that are employed in SIM has led to attempts to standardize and coordinate the description of data within these datasets. This so-called metadata is now standardized as an international standard ISO 19115 (International Standards Organization, 2003).

The standard defines hundreds of data elements all within a broadly based thematic classification involving 19 categories. Eight of these: atmosphere, biodiversity, environment, farming, geoscience, inland waters, oceans, and planning (for future use of land) are of particular concern in the natural resources area. However, other categories such as boundaries and location (positional information) are also of interest.

### Infrastructure

Although ASDI provides a national framework in Australia, there are normally State-based mechanisms for ensur-

ing development and delivery. At this level in Australia, examples include:

- Queensland Spatial Information Infrastructure Strategy (QSIIS). A key delivery initiative is Information Queensland (IQ)
- Western Australian Land Information System (WALIS). A key delivery initiative is the Shared Land Information Platform (SLIP)
- New South Wales Natural Resources Information Management Strategy (NRIMS). A key delivery initiative is the Community Access to Natural Resource Information (CANRI, 2004)
- Northern Territory Land Information Management Coordination Group (LIMCG). A key delivery initiative is the Northern Territory Land Information System (NTLIS).

Each of these initiatives requires cooperation and participation between three tiers of government, the private sector, and the community, each of which has roles and responsibilities in the development of the spatial information industry at the state level. These initiatives assist easy access to relevant and reliable integrated spatial information in each State and provide a supporting infrastructure which enables jurisdictions to improve productivity and efficiency, make lifestyle and community choices and manage each state's resources.

Research in spatial information system design and data infrastructure at a national level is being undertaken through mechanisms such as the Cooperative Research Center for Spatial Information. The research outcomes of this project will provide a foundation for identifying best practice and key performance indicators to aid in implementing a virtual Australia.

## NATURAL RESOURCE INFORMATION INTEGRATION: CASE STUDY

### A State Level Government Department

The Queensland Department of Natural Resources and Mines (NR&M) has lead-agency responsibility for the management of land, water, native vegetation, and mines in that State. Through planning and management responsibilities for these natural resources, it has a vision for "enhanced community benefit through sustainable natural resource management" (Queensland Department of Natural Resources & Mines, 2004). NR&M holds an array of data and information about these resources, gathered by various means over many years, with a replacement value estimated to be around A$5 billion. Ready availability and access to data and information is critical to delivering business outcomes and responding to emerging natural resource management issues.

Machinery-of-government changes over the last decade brought together several agencies into NR&M. With these came a legacy of disparate information systems with an equally disparate approach to the management of the data and information contained in them. It was apparent that issues such as salinity and water quality, water resource planning, vegetation management, greenhouse gas emissions, and erosion relied on an integrated response from more than just one business area—they required a "whole of landscape" approach to solving these topical issues. Another consideration was that much of the data had previously been captured for specific and somewhat isolated projects with differing requirements. This contributed to ad hoc information management (IM) processes throughout the organization resulting in such anomalies as pockets of data with differing scales, and attributes captured to various standards.

In 2000, senior management commissioned a business case to analyze the existing practices and provide a blueprint to create an environment where any required natural resource information could be easily integrated for rapid answers to issues arising. This Environment for Natural Resource Information Integration (ENRII) initiative stated that:

*The main focus is the data and information management processes needed to support the delivery of the department's integrated resource management outputs. The aim is to ensure data are accessible, well structured, of suitable quality and consistency, available for use efficiently and in a timely manner, and protect the value of the department's corporate natural resource data holdings, for now and the future.* (Queensland Department of Natural Resources and Mines, 2001, p. 9)

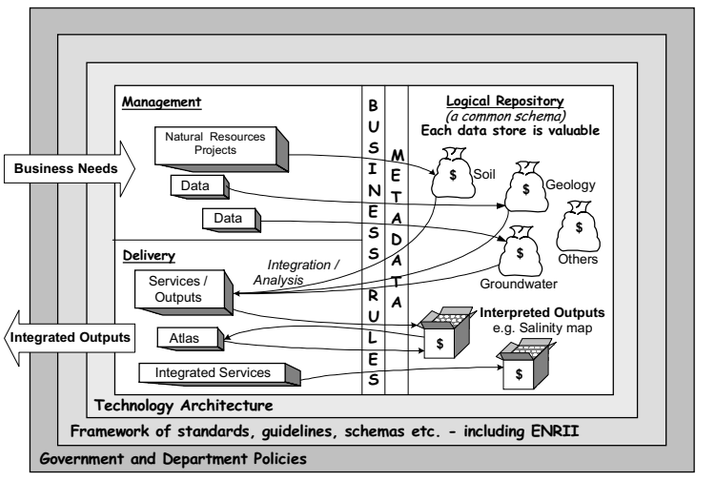
This case stimulated senior management to embark on a journey of cultural change from the former "silo mentality" of managing individual business-specific data stores, to a corporate approach with much broader benefit.

### ENRII Concept

The ENRII concept is to bring about a change in the organization to improve the management of data and information needed for natural resource management activities through:

- A framework of standards, specifications, and operational level guidelines

*Figure 1. ENRII–a conceptual view*




- Having efficient critical database management systems in place that provide "point of truth" storage for data and information; where data and information are acquired, used and re-used for many purposes by many business areas and other stakeholders
- Effective methods to access, use and distribute data and information
- Optimal network performance and data transfer methods
- Integration of data and information for natural resource management activities across all business areas

The concept highlights that data and information management must be seen and resourced as part of normal business practice, and not as an optional extra. A complementary suite of policies, standards, and architectures must be in place to support the storage, management, and delivery of corporate data and information, as shown in Figure 1.

The rectangles in Figure 1 can be likened to "onion rings" where each aspect of management is contained within, or builds on, a wider aspect, yet all work together to provide an integrated infrastructure for managing corporate data and information. Data move into and out of logical repositories past two "gate-keepers," namely the business rules which govern things such as how the data will be stored and who can access the data, and the metadata that describes fitness for purpose.

## Methodology

Examination of how IM practices were carried out focused on business functions as opposed to the structural units of the organization. It was thought that "what we do," had a greater chance of longevity than "where we sit" considering the machinery of government changes that had occurred in the past. This was vindicated towards the end of the business case project, when the Forest output was moved away from the department, and the Mines output was added. The methodology was able to cater for the changes without any reengineering.

Research was undertaken across the whole of the department via a comprehensive questionnaire for each of the identified business outputs. A reference group assisted the ENRII team in providing guidance to 44 experienced staff that regularly used and processed departmental data and information. A companion to the questionnaire provided standardized answers to assist in gaining a comparative result. Senior managers and executives were also interviewed.

The major steps in the methodology were to:

- Define functional business activities, model these in context
- Investigate current IM processes using the questionnaire and analyze the results
- Link IM processes to the business functions and assess synergies, deficiencies
- Assess the benefits of having a coordinated and consistent department-wide IM framework
- Assess possible solutions to solving the identified problems
- Assess broad costs and economic benefits for improving corporate IM processes
- Propose an action plan with recommendations on how to proceed

*Figure 2. High demand data sources*

| Data Source | Business Functions Supported |
|---|---|
| Digital Cadastral Database (DCDB) | 52 |
| Climate | > 20 |
| Geology | > 30 |
| Imagery (satellite) | 39 |
| Soil and Land Resources | 39 |
| Vegetation (regional ecosystems) | 27 |

## Findings

### Interaction and Process Flow

Considerable interaction between business areas in supplying and sourcing available data was revealed. It was found that 240 unique data sources were identified in the questionnaires and that these supported over 80 business activities. Of the 240 data sources, 59 each support more than 10 business functions. The six highest demand data sources are listed in Figure 2.

Once the flow of information, products, and services were mapped between business functions including transactions with external agencies, a picture of integration emerged. More clarity become apparent about the diverse and complex nature of information needs.

Information process flow (IPF) diagrams were prepared to articulate the priority data sets and how these may be used to deliver outcomes for the department. An example is shown in Figure 3, where data sets are analyzed within processes to produce outcomes.

Such diagrams provide the basis for understanding data and information needs and flows, and how the data might best be managed and made available. Mapping these IPFs forms the basis of a knowledge system that puts rigor behind information processes and promotes understanding on how data and information flows are an essential contributor to delivering whole systems science for natural resource sustainability.

Assessment and analysis from developing the business case also provided much information about current practices, as explained in more detail following.

### Data Storage

A significant proportion of important data sets are stored only on the local server. Figure 4 illustrates this with the

*Figure 3. IPF diagram for groundwater flow systems*

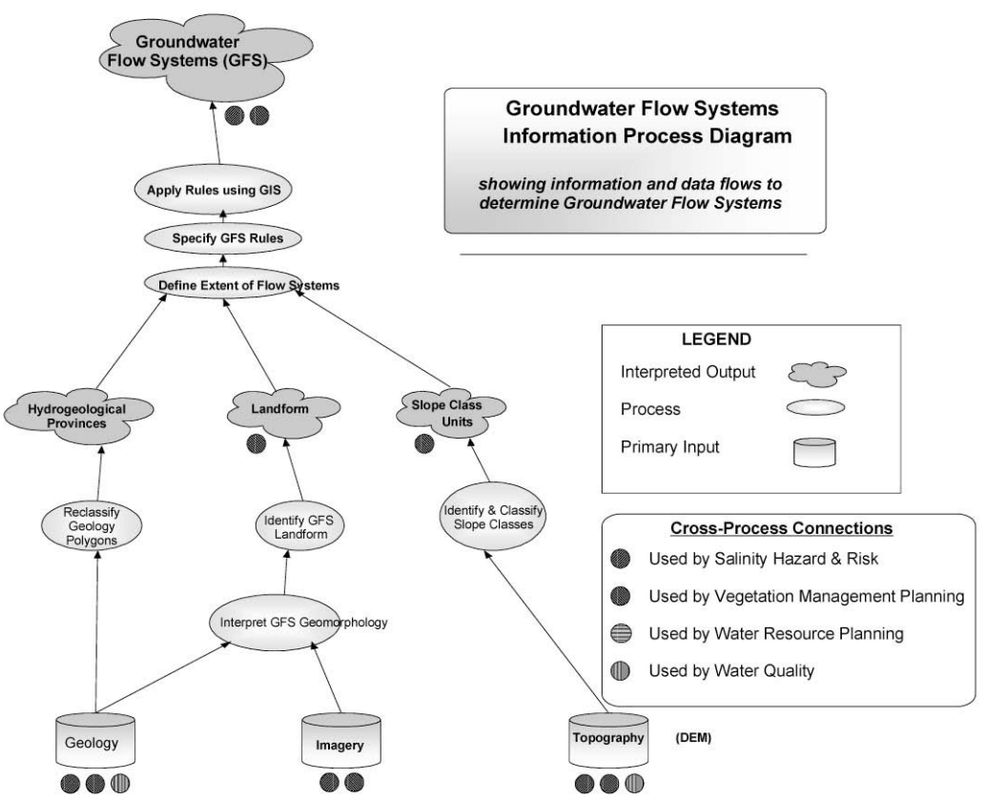
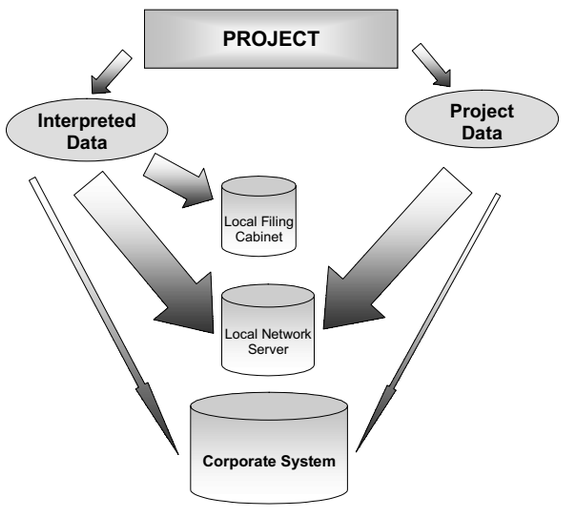


*Figure 4. Data storage and flows*




size of the arrow being an indication of the amount of data stored in the respective storage point.

This presents significant problems in the management of data including:

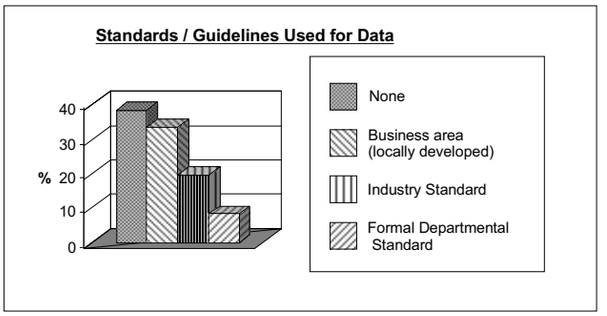
- Duplication of effort in storing data
- Inefficiencies in the storage space used by duplicated data sets
- Inconsistencies in updating the data across different regions
- Inconsistent decisions based on out of date "duplicated" data across regions

## Standards

A framework for standards, guidelines, and procedures make sure there is an alignment to business drivers, particularly in respect to data management systems, data access, and data sharing. Figure 1 shows how a standards framework fits within the conceptual view of ENRII. A framework looks at:

- Establishing agreed standards for data collection, management, documentation and processing
- Reducing duplication of effort in establishing standard (not developed in isolation)
- Establishing naming conventions for data sets and data storage methods
- Ensuring standards exist and are easy to find and are accessible
- Ensuring standards can be interpreted, understood, and adhered to

*Figure 5. Standards/guidelines used for data*




Standards, guidelines, and procedures are required to ensure data is captured or stored in a form that can readily be integrated with other data held by the department. This data can then be collated to build regional and statewide layers on the network. Standards also help steer any development or re-development of data sets and protect the value of the department's corporate natural resource data holdings. Figure 5 shows that some datasets have either no standards, or it is unknown if any standards are used.

The result is an inability to build regional and statewide layers to consistent standards. There are a significant proportion of standards, guidelines, and procedures that are locally developed within business areas. These are developed by individual business areas and may not be accepted throughout the department. The fact that a necessity exists for locally developed standards may indicate that formal standards are not available or not regarded as being suitable for the data. Nevertheless, a corporate approach to promulgating these standards is desirable to minimize inconsistencies across the department.

## Data Suppliers

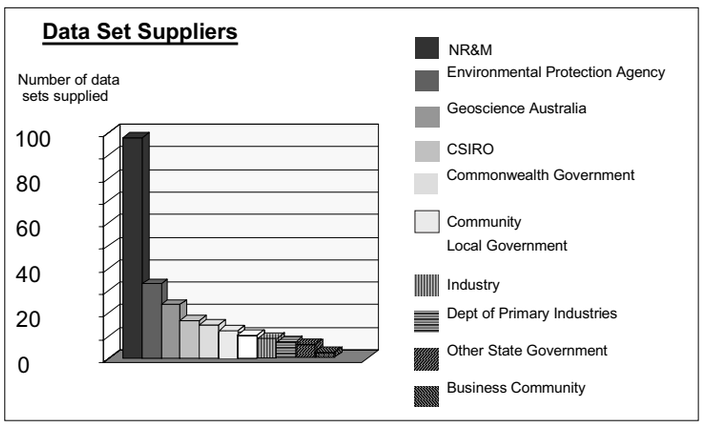
The department receives data from many organizations in order to do its core business, as illustrated in Figure 6.

Often, different business areas will obtain the same data for individual business needs leading to unnecessary duplicate storage of copies and versions across the organization. This reinforces the need for a corporate store of natural resources data to enable efficient access in real time from a recognized single point of truth.

## Action Program

ENRII consists of five main initiatives focusing on the data and information needs that support the core business of NR&M. Three of these are underway and are

*Figure 6. Data set suppliers*




discussed in this section. Two future initiatives are discussed under Future Developments.

## IM Standards and Custodianship

NR&M follows a custodianship model that provides a select group of senior policy managers with delegated responsibility for managing data and information relevant to the department's business. Data is categorized under themes based on the ISO 19115 metadata broad topic categories, which provide a comprehensive approach to high-level groupings of data.

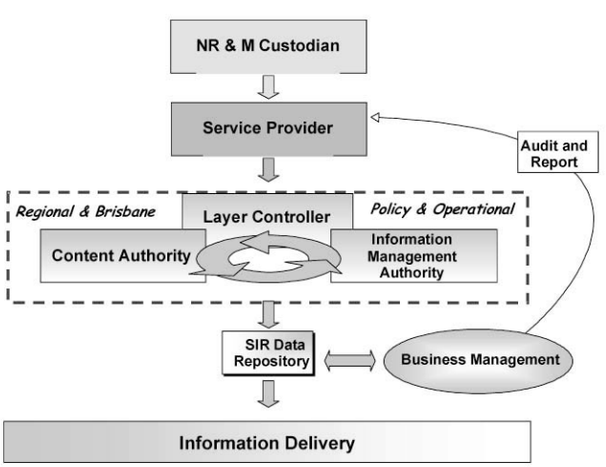
IPF diagrams such as Figure 3 allowed custodians to understand the totality of their responsibilities for not only the underlying data sources, but also the business processes and higher level information outputs that contribute to a high-level business outcome. Endorsement by NR&M custodians for each of the information flows mapped under this process was a major milestone in bringing about a cultural change to understanding the value and significance of the whole process. These diagrams formed the basis of adopting standards and developing protocols for managing the whole process and ensuring that all contributing data and information stored along the way was to a known and agreed level of quality assurance. This included such things as adopting standards for metadata (ISO 19115), data dictionary (NR&M Data Naming Convention) and agreement on standard presentation descriptions. Protocols for viewing, using, and updating the data within the organization and access constraints for external distribution were developed.

To ensure that these standards and protocols were implemented, a training and accreditation program was introduced throughout NR&M to train over 50 staff throughout the State in three distinct roles of layer controller, data management authority and content authority. This is illustrated in Figure 7. The roles are complementary to ensure that the data are verified and described as "fit for purpose" from a scientific, technical, and information management perspective. The process strives for a level of confidence in the data by both the end-user and the custodian and has been a significant step forward in bringing a cultural change to take IM into normal business practice.

## Spatial Information Resource (SIR)

The ENRII initiative developed the SIR as a corporate resource to managing natural resource spatial data and information that was previously captured for independent projects or did not have a logical corporate "home"

*Figure 7. Custodianship model*



(Queensland Department of Natural Resources and Mines, 2002b). Initially, the facility is storing data and information used in the NAP process, and will be the "single point of truth" repository for this information for the whole of the department. This approach advances the management of spatial information according to custodial requirements and helps to set standards and protocols over the previous ad-hoc and inefficient local arrangements. The information in this facility is managed within the framework of roles and responsibilities that operationalize the departmental custodianship standard.

At the data management level, the facility allows storage of base and interpreted data for individual projects as well as providing a statewide layer view. Only authorized users undertake data layer updates that are stored on the central server. Data volumes are scalable according to current and emerging needs. The facility provides efficient spatial data serving including the use of smart images of data as opposed to streaming only of required data for local use via Internet technology. The data served to all users is thus consistent from a "single point of truth."

The SIR facility provides a multi-user access & management environment for:

- GIS applications
- Web mapping applications (Open Geospatial Consortium (OGC) Web Map Services)
- Data discovery and access services

### Corporate Registry Service (CRS)

A current activity is the development of a registry (or catalog) service built on a services-oriented architecture using emerging open standards and specifications. It will become a gateway for NR&M staff to find and initiate Web-based data and information services from the department's many authoritative source data repositories. This will allow sharing and reuse of these Web services across the organization.

The initial implementation demonstrates seamless integration of a number of Web services from five candidate systems within NR&M. Each individual business system publishes its catalogue (or list) of Web services, which describes what those services contain (metadata), and what those services do (capabilities). The process provides a common mechanism to describe, classify, register, search, find and access data and information services from the point-of-truth data stores. This is achieved by adopting appropriate standards to enable interoperability between the data stores.

For example, many business outputs need to use property boundaries as a reference for location. By publishing a "data service" in the CRS, property boundaries are delivered to business users' applications from their "single point-of-truth."

Numerous other Web services may be created, accessed and shared in a similar manner. As well, the combining of more than one service may be achieved to form more detailed or complex outputs.

A service-oriented architecture provides seamless integration through the loose-coupling of business functions (applications/corporate databases, etc.) by offering a suite of Web services that are available for re-use by many applications across an agency. These Web services are described with metadata and perform a prescribed function set by the service provider to meet the needs of service clients. Web services are essentially re-usable business objects, in that they can be developed once and used many times. The corporate registry service is a key component of a service-oriented architecture. Such architecture will enable business systems in NR&M to share data and information to meet the department's need for more holistic approaches to natural resource management.

## FUTURE DEVELOPMENTS

### Knowledge Management Processes

In a large organization, data and information may be used in many contexts beyond the initial purpose for which it was captured. The data stores may be managed well in "silos," but possibly in ignorance of how the information flows through various processes to reach high-level organizational objectives. These objectives in themselves are recognized as "must-haves," in order to achieve business goals, but achieving the information transfer is often misunderstood, undocumented and hence inadequately resourced. Furthermore, the way that the information flows and the effects that processes have on the data, form the basis of the organization's knowledge management.

Work completed for IPFs to date provides a platform for documentation of a corporate knowledge management system that will show how work practices, modeling procedures and operational processes are undertaken. It will provide a rich source of understanding of how business outputs are arrived at from a policy, planning, and scientific aspect.

### Influence of Cultural Change

Each of the previous initiatives is reliant upon a significant cultural acceptance to change the way that data and

information at all levels is managed, resourced, and preserved. The ENRII philosophy is to promote a corporate culture where major projects are undertaken with "eyes wide open" with respect to the information needs. Organizations need to plan for the whole lifecycle management of data and information generated and assembled not only for a specific need but also for the future after a project is completed.

## CONCLUSION

ENRII is an investment by the department in support of its corporate objectives (Queensland Department of Natural Resources and Mines, 2002a). The approach provides a model for similar SIM initiatives at government level, in particular by:

- Taking a leadership role in the stewardship of natural resources
- Building organizational capability to improve business performance

Each of the initiatives outlined fosters a cultural change within NR&M relating to its understanding, use, and management of information in order to unlock the wealth of this information for the benefit of the community and future generations. These are not achieved without addressing challenges such as:

- Allowing time and providing resources to plan for future
- Fostering culture to look beyond short-term project needs
- Actively collaborating across business boundaries
- Determining how to fund and maintain through a full lifecycle
- Providing leadership and management

These should lead to impacts that include:

- Enabling effective response to the government
- Providing better informed support for decision making
- Achieving improved services delivery
- Significantly improving access to data and information

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## KEY TERMS

**Authoritative Source:** A place where data and information from the point of truth are made accessible for others to use. The access constraints and quality of data and information delivered from the authoritative source is the responsibility of the custodian of that data and information.

**Catalog Service:** See Registry Service.

**Custodianship:** Responsibility for data stores and information flows.

**Geographic Information System (GIS):** A specialized form of an information system capable of assembling, storing, manipulating, retrieving and portraying location-referenced information from a database.

**Information Process Flow:** Schematic illustration of relationship between data, its interpretation, and outcomes of its use.

**Knowledge Management:** Application of information management with human resources procedures to make effective use of unstructured personal knowledge and

structured corporate information to address corporate objectives.

**Metadata:** Information that describes other information—in spatial terms this may range from the creator of a document to map coordinates.

**Point of Truth:** The single place where data and information are maintained and updated to meet the requirements of their custodian. The point of truth may or may not be an authoritative source for use by others depending on the level of risk to the primary maintenance function.

**Registry Service:** A tool providing client applications the ability to discover data and information services from online catalogs through searching metadata about these services. OGC conformant registry (or catalog) services will enable a Web browser to report Web sites that contain certain data themes for certain geographic areas for certain time frames.

**Spatial Information Management:** The management procedures required for dealing with location-referenced information, including management of GIS and the procedures associated with GIS use.

**Web Services:** Self-contained, self-describing, modular applications that can be published, located, and invoked across the Web. Web services perform functions that can be anything from simple requests to complicated business processes or geoprocessing resources. Once a Web service is deployed, other applications (and other Web services) can discover and invoke the deployed service according to its described capabilities.

# Negotiation Strategies Based on Decision Conferencing



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## INTRODUCTION

Our current democratic institutions stem from times in which transportation and communications were difficult and time consuming. With the time, politics have evolved little and politicians have developed a style in which, except at political campaigns, they have little feedback from citizens. Most ideas so far relating Internet and politics are directed toward facilitating traditional political methods through new technologies. Our feeling is that there are ways to transform, rather than facilitate. This transformation is possible because when the way in which the citizens interact with their representatives is modified, and this transformation makes possible that citizens play an active role, they could make decisions of major quality and more agreed by consensus, which is not possible with the mere automatic use of the new technologies, since it is not the same thing to allow that a citizen could vote from his or her house, facilitating the use of the traditional political methods, that in addition to be able to guide to this one in the different phases of the decision making, doing that his or her judgments and preferences are taken in account by the system. We propose migrating to Internet methodology of decision conferencing to support group-decision conferences through our architecture, QUIXOTE, born of Toward Electronic Democracy (TED) project of the European Science Foundation (ESF).

Thanks to our architecture we distribute rationality to better resolve political decision making, helping groups through the Web facilitating them the use of decision and negotiation analysis methods.

## BACKGROUND

There have been several attempts to give a new approach to the democratic processes, and to the way in which the citizens are related to their governors. All this to revitalize the democracy and to make that the opinion of the citizens will be really considered, being this is something very necessary as pointed out by authors such as Pateman (1970) or Putnam (2001). Until now, attempts to transform democracy through the Internet have chased just to facilitate through the new technologies the standard political methods, which we think leaves much to be desired. For this reason, our intention is of transforming these processes making that the citizens interact in all the phases of the decision making. With this we could make it possible to reach solutions more agreed by consensus and of major quality, being this necessity is something already pointed out by the United Nations (2004) in its reports on the degree of preparation of the different countries for electronic democracy and government.

Therefore, to change our representative democracy to a deliberative one we use several tools, as decision analysis, thanks to which we can identify and construct all the elements of interest of a decision problem determined, being able to advise citizens on the consequences of their actions and choices since we give a treatment adapted to the uncertainty inherent to the problems of decision making. With this we could make better and more informed decisions since we explored all the implications and subjective suppositions of the different citizens. In the same way, thanks to the structuration of the decision problem, the clarification of the different aims and the qualitative and quantitative study of the possible choices, we can do that the citizen has a major knowledge of the decision problem which he or she faces, showing him or her, therefore, the best strategy to follow according to his or her interests. Moreover, inside the tools of the decision science, we also use the negotiation analysis, with which we will be able to treat those cases in which there are different parts implied that can reach joint agreements.

To this set of tools we have to add the cryptography, thanks to which we can assure that all the processes and the interchange of messages between the system and the citizens, is realized in a safe way, being this is an indispensable requirement in this type of system.

## QUIXOTE ARCHITECTURE

We build an asynchronous Internet-based implementation of decision conferences to support group decision processes, migrating with this way to the Internet the methodology of decision conferencing (McCartt & Rohrbough, 1989). With this methodology we can focus on a particular task or problem combining participants'

judgments with data. The main tasks to develop in this phase are:

- Represent the diversity of perspectives on the issues
- Generate shared understanding of the issues
- Develop a sense of common purpose
- Create the structure of a model that of the decision problem
- Develop a better appreciation of uncertainty

In QUIXOTE, this decision analysis would be carried out by a decision analyst on a master system for the decision-making problem owner, where the system would provide support for the entire decision-making cycle (Clemen, 1996) using several modeling techniques to construct the preferences in certainty and uncertainty, identify and structure the problem, and add the judgments and behaviors of the citizens. At various stages of the process, some or all of the models would be fed into a server, which could be accessed by different stakeholders and the general public. When an issue is being addressed the server provides pages inviting comments and submissions, for later develops pages actively which allows users to interact with the model to explore the implications of their individual perspectives and judgments, with what the citizens could construct their preference models. All is supported by the Internet with confidence built in through a cryptographically secure open truthful exchange (CSOTE) approach (Rubio, 2004; Rubio, Rios Insua, Rios, & Fernandez, 2005).

The difficulty lies in the different values and beliefs of the stakeholders, which would opt for different alternatives. For that reason is necessary to enter into a negotiation round in which a more consensual solution might be sought. Also we have to consider the contexts in which no consensus is reached, where we appeal to a voting scheme.

## DECISION CONFERENCING

Once users have built their preference models, they will assess their utility functions (French & Rios Insua, 2000) privately and communicate it to the system. The system allows for the specification of basic properties of multiple objectives as number of objectives, their scale and range, whether the objective is to be minimized or maximized and the assessment of each component utility function with the probability equivalent method (Rios & Rios Insua, 2004; Rubio, Rios Insua, Rios, & Fernandez, 2004). Later, with the preferences of each participant, we may proceed to compute his or her optimal alternative. For that purpose, the system includes a module that allows users to evaluate the influence diagram, with which we structure the decision-making problem, based on his or her utility function, to obtain his or her preferred maximum expected utility course of action. Frequently, the various parties involved will reach different optimal solutions and for that reason a round of negotiations may be undertaken to try to reach a consensus. This negotiation is done by the CSOTE method and a modification of the balanced increment method (Rubio et al., 2004), where at each iteration the system offers a solution to participants and if this is accepted, it stops, that being a consensus. To help the negotiators to reach a consensus the balanced increment method show the ideal expected utilities achievable within the nondominated set of solutions, which guarantees that there is no other alternative unanimously preferred by the citizens.

## THE CSOTE METHOD

One of the most important issues related with e-democracy is the confidence and trust among system users. For this reason, we have built on what we call the CSOTE framework, in contrast with the FOTE and POTE frameworks described by Raiffa (2002). By CSOTE we understand cryptographically secure open truthful exchange of information among participants and the system, enhancing reliability of all processes, achieved through confidentiality of system data which will be accessible to only authorised parts, communications security protecting bidirectional channels user system, data integrity so that they are only modifiable by data owners and accessibility mitigating system attacks. All these issues may be achieved through cryptographical methods, and specifically with public key cryptographical methods (Goldreich, 1999; Lee, 2001; Schneider, 1996), with which we develop a more open, flexible, and reliable framework for negotiations in which the involved parts may reveal their real objectives and achieve satisfactory agreements. This also aids us in automating negotiation processes as we may support all the issues we are interested in.

Specifically, we can use these methods in the following phases of the negotiation: interaction with the system, negotiation phase, and voting phase if there is no consensus. In the interaction with the system a participant must send his information to the system and, possibly, may wish to obtain a summary of the opinions of other users. For this purpose, we use, among others, the following methods:

- **Partial Secret Revealing Techniques:** They are based on the global knowledge of a function, with

each party knowing and revealing only a part of the information of the function and ignoring the rest. Some applications are facilitate comparison of the utility functions of participants, should they wish to, with minimal revealing of information. With it, they could find out which of them is more risk averse or compare their weightings of various objectives, without revealing their exact values, to find out which participant gives bigger importance to a criterion.

- **Zero Knowledge Techniques:** We use ElGamal's cryptosystem as a basis to determine the equality or inequality of two discrete logarithms and build knowledge proofs to verify users' information. Thanks to which the users may obtain any kind of partial information about other users' preferences, with them no revealing no more than the necessary information, and therefore protecting the rest of it.

In the negotiation phase, the CSOTE methodology is specially relevant. Once the users' preferences have been stored, we may proceed to look for alternatives satisfying the involved parts. For that purpose, we use, among others, the following methods:

- **(k,n)-Threshold Schemes:** An interesting piece of information (a secret) is divided in parts, in such a way that we only need to know $k < n$ of them to recover the secret. We apply this method to ensure that the choice of a certain action is made only if k users out of the existing n go for it.
- **Selling of Secrets Techniques:** With them, a buyer chooses what (secrets) to buy, with the seller not knowing what he or she has sold. We use the RSA cryptosystem, generating k cryptosystems, with special features, together with Jacobi symbols to enhance transparency in negotiations. To wit, with them, users may undertake exchanges and, moreover, negotiate over any set of elements or objectives in a transparent manner. Moreover, each user has the possibility of weighting their choices, as well the importance of the elements to negotiate.

Finally, if there is no consensus, we enter into the voting phase. To undertake this process, we must take into account the transparency, the capacity of the user to verify his or her vote and, last but not least, the capacity to avoid a voter as not being able to give proof of his or her vote to another entity, so as to avoid vote dealing. At the moment, most known schemes are based on critical assumptions which make them vulnerable, including the existence of truthful communications and a truthful third part. Alternatively, we opt for using schemes which include a tamper-proof randomizer (TPR), which allows us to randomize votes, leaving aside the need to use reliable third parts.

## FUTURE TRENDS

One of the main aspects in which we have to center all the efforts is the treatment of the so-called mental tunnels, which lead to systematic mistakes in the decision making (Kahneman, Slovic, & Tversky, 1982), reason by which any group decision support system have to be robust against this type of threat to the rationality since until now in the majority of existing systems this type of problems has received a not completely exhaustive treatment (Hämäläinen, 2003; Mustajoki, Hämäläinen, & Marttunen, 2004), and given the importance of this topic the implementation in the group decision support systems of these cognitive aspects have to be studied with major depth. In the same way, we have to be capable of making intuitive systems, which can be easily used by citizens, because below this type of systems are mathematical concepts, in many cases foreign to the average citizen, reason by which these concepts have to be explained in such a way that any citizen feels comfortable in their use.

Therefore, the adequacy of this type of systems to the average citizen is undoubtedly the major labor to develop, and although there are already different studies realized in this field (Gregory, Fischhoff, & McDaniels, 2005; Mumpower, 2001; Rowe & Frewer, 2000, 2005), still the aspects to study are considerable.

## CONCLUSION

Rather than using new technologies to facilitate standard political decision making mechanisms, our scheme would radically modify them by allowing more participation from stakeholders and a more consensual approach, not remaining therefore in a mere automation of the traditional political systems, going beyond since the citizens could participate in a more active way. We have outlined issues concerting trust and confidence, key in e-democracy.

In the same way, we have pointed out the new technologies that can help us to rationalize the political decision making, being able to make decisions of major quality and to help ourselves stop the political discontent extended in the society in the last years, since the citizens could see the political decision making as an opportunity in which to express their opinions, taking active part in these processes. Moreover, it has been demonstrated that under suitable circumstances the groups demonstrate a notable intelligence (Surowiecki, 2004). So, in the decision making the collective decision is in the habit of being an indication of excellence, being the key of the success in satisfying the conditions that

the group needs to demonstrate its intelligence, which can be reached by all the tools showed for the group decision making.

This type of framework of decision making will be of great importance in the future, since a considerable number of countries and organizations are studying ways in which to develop electronic participation systems, looking for a suitable way with which to cover all the chased needs. We believe that our system, and the concepts treated in it, can perform well in the future.

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## KEY TERMS

**Balanced Increment Method:** Multilateral negotiation method where the system does equitable offers to the parts, and according to the given answers the system continues giving solutions up to coming to consensus.

**Cryptographically Secure Open Truthful (CSOTE):** CSOTE is a negotiation paradigm that overcomes other paradigms such as FOTE and POTE by means of a great set of cryptographic methods, not making suppositions about the style of stakeholders, so as they forget the strategy taken to limit.

**Full Open Truthful Exchange (FOTE):** FOTE is a negotiation paradigm developed by Raiffa in which it is

supposed that all the parts involved in the negotiation use a collaborative style saying all the truth.

**Influence Diagram:** Graphical method that allows the problem owner to structure the decision-making problem in terms of uncertainty, decision, and value nodes.

**Partial Open Truthful Exchange (POTE):** POTE is a negotiation paradigm developed by Raiffa in which it is supposed that all the parts involved in the negotiation use a collaborative style saying the truth but not all the truth.

**Probability Equivalent Method:** Method in which the system raise to the user the comparison of several bets. The idea consists of proposing a concrete initial value of probability for the bets, and to be fitting the probabilities until the user feels indifference among these, which was indicating the looked value.

**Public Key Cryptography:** Based on the use of a pair of keys, where with one we encode and with the other we decode a message. One is in the possession of the owner, private key, and the other key is publicized, public key.

**Server:** A computer in charge of providing decision models to different stakeholders.

**Utility Function:** Associate with a stakeholder, reflect his or her weighting of attributes and the inclination or aversion to risk.

# Net Diplomacy

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Looking back to the not-so-distant past, one is struck to learn how much the world has changed in the last 30 to 35 years. New developments in major spheres of activity and new ways of knowing have altered, redefined or even transformed, in some cases, the ways we think, act and do things in the world. Changes are evident in all walks of life. In global politics, the end of the Cold War and the fall of communism have brought to the fore new actors and new issues. Nation-states are the principal but not the sole actors on the world stage. International organizations (IOs), non-governmental organizations (NGOs), transnational corporations, social movements and other non-state entities like media organizations and terrorist groups play an important role in setting the agenda and exerting influence on a global scale. Traditional concerns of sovereignty and security are still important, but policy-makers and academics are asked to re-conceptualize these concepts in lieu of the challenges posed by globalization and new threats to human security, like economic and ecological degradation, terrorism, massive immigration flows, the spread of infectious diseases and contamination of the food chain, to name a few.

To deal and adjust in a very competitive world economy, the corporate sector has espoused flexible accumulation, a regime based upon vertical production disintegration (sub-contracting, outsourcing, etc.) and encompasses innovation and differentiation in the production and marketing of products and services (Harvey, 1990).

Breakthroughs of a similar magnitude have also occurred in the areas of strategic thinking and military organization. Military operations incorporate new information and communication technologies (ICTs) and technological surveillance systems with the aim to bring the enemy to its knees through precision, surgical targeting. For military units to perform optimally, the command system must be decentralized and important decisions must be left to the operating units. Military analysts in the United States (U.S.) have gone so far as to label the new logic in the thinking and conduct of warfare a revolution in military affairs.

Underlying new developments in all realms of human activity has been an information revolution (Keohane & Nye, 1998). The innovations and breakthroughs in the ICTs of the past 30 years have no parallel in history. Developments in telephony have been superceded by fax and TV, satellites, cable TV networks and, last but not least, the expanding potential of computers connected in networks in the private (intranets) and public (Internet) spheres of life. The Internet and World Wide Web have grown exponentially, with 812,931,592 million people at present capable of accessing the Internet (Internet World Stats, 2004). All major powers that comprise the G-8, with the exception of Russia, figure in the list of top 10 countries with highest percentage of Internet users per capita. The U.S. leads the way, with a 68.8% Internet penetration rate, followed in descending rank order by Canada (64.2%), United Kingdom (58.5%) Germany (57.1%), Japan (52.2%), Italy (49.3%) and France (40.6%). (Internet World Stats, 2004). Other countries on the list include South Korea (62.4%), Brazil (10.8%) and China (6.8%) (Internet World Stats, 2004).

Speed, the vast quantity of information available and easy, low-cost access to information are main features of the information revolution transforming identities and recasting professional practices like diplomacy in a new light. According to Keohane and Nye (1998), information comes in three forms: strategic, commercial and free. Strategic information is ingrained in intelligence and reconnaissance systems and vital for early warning, preventive measures as well as for carrying, if needed, military operations. Companies provide commercial information in exchange for a payment. Products are traded and sold and services are offered over the Internet. The burgeoning activity surrounding e-commerce falls in this category. Free information is the most widespread form in the public sphere. Nation-states and non-state actors alike post information on the Internet to communicate, persuade and motivate their audiences to action. Information's pivotal role in global affairs is acknowledged in the concepts of soft power and information edge. The persuasiveness of free information enables an actor to exercise soft power; that is, to accomplish desired outcomes because other actors acknowledge and follow the lead of the initial actor in setting the agenda and/or establishing norms and institutions that bring about the desired outcome (Keohane & Nye, 1998). Information as a component of soft power can offer a comparative advantage or an information edge to those states and non-state actors that know how to use and exploit the new ICT (Nye & Owens, 1996). For example, some nation-states develop information edge in the area of strategic communication,

whereas non-state actors develop networks, disseminating information over the Internet and mobilizing supporters on global issues.

The sweeping winds of the information revolution could not leave unearthed even areas of activity known for their conservatism and skepticism to adjust to rapid change like the practice of diplomacy. Up to the present, diplomats as a profession have privileged courtesy, patience and compromise as modes of operation. Diplomatic time is slow and change is accomplished by an incremental step-by-step approach. Diplomats, as members of the diplomatic corps, observe formal as well as tacit rules of behavior and share a communal sense of belonging reinforced by their socialization practices and ritualized interactions. In terms of skills, diplomats rely upon face-to-face interpersonal relationships and have been lagging behind the military officers in upgrading their technical skills. In mediating conflicts and negotiating settlements, diplomats are inclined to favor secret meetings among state elites over open communications and deliberations engaging broader segments of societies. In terms of training, their educational backgrounds originate from a number of academic disciplines (i.e., history, literature, political science, economics, international relations, etc.) and the glue that seems to bind professional diplomats together is their common realist orientation to the understanding of world affairs (Onuf, 1989, p. 249). One can easily surmise that the profile of diplomats is not conducive to the fast pace, transparent and publicly debated mode of communication engendered by the information revolution. Perhaps diplomacy and information and communication technologies may not be a good match but the former can afford to ignore the later at the risk of its own peril.

There is widely held agreement that the key diplomatic functions involve representation, communication and negotiation. To these functions one may add promotion of economic-commercial and legal interests, promotion of cultural relations and policy advice to decision-makers (Jönsson, 2002, p. 215). What remains, though, still in dispute is who represents what entities. Narrow conceptions of diplomacy, advanced by the realist school in international relations, acknowledge professional diplomats as agents of states in an international system of nation-states. Broad conceptions of diplomacy, more attuned to critical and interpretive perspectives in International Relations extend representation to include non-state actors and define diplomacy as "a regulated process of communication between at least two subjects, conducted by their representative agents over a particular object" (Constantinou, 1996, pp. 25-26). Diplomacy involves the sustained exchange of information and the practice of persuasion among state and non-state actors for reaching agreement and solving problems on national and global issues. The communication function remains central to both conceptions of diplomacy and inquiring into the effects of the information revolution on diplomatic practice is pertinent as ever.

The key question to ask is how the information and communication technologies, along with the force of globalization and the emergence of a vocal global civil society, are impacting the conduct of diplomacy. To address this question, we will examine changes that are occurring at the substance and the practices of diplomacy. We will then proceed to demonstrate, by reference to a number of examples, how governments have adjusted to the information revolution and how non-state transnational actors have been empowered by information and communication technologies.

Information and communication technologies (ICTs) and the force of globalization have undermined territorially-based state sovereignty. Territory as a dimension of world affairs is downgraded and the conception that the world resembles more a network of nodes representing organizations, individuals or portals in cyberspace warrants serious consideration. Nation-states are still the principal actors and retain the power to grand or withhold recognition in a system of states. However, interdependence among nation-states, the effacing of the domestic-foreign divide in addressing global issues and problems and the new opportunities afforded by the use of information and communication technologies, have brought about both a re-conceptualization in the substance and practices of diplomacy and a diffusion of diplomacy to transnational non-state actors that comprise global civil society. Presently, diplomacy is "shared by all who speak and act on a global level to arbitrate, negotiate, mediate, or any way represent the multiple perspectives that make up these publics" (Brown & Studemeister, 2002). As a consequence, diplomatic activities are carried out not only by professional diplomats but also by others like nongovernmental organizations, social movements, activists and representatives of transnational businesses. All these entities address global issues either collaborating through the formation of global policy networks or coalescing against policies of states and international organizations. It is becoming increasingly apparent that the actors of the new networked global society appeal and attempt to persuade a global public opinion of a multilayered and ever-shifting composition of interests.

As already mentioned, speed, easy access to vast amounts of information and transparency characterize the information revolution. Each of these characteristics is impacting diplomacy in a number of ways. Speed allows high-level officials in foreign ministries to process and analyze information. In this respect, officials charged with decision-making benefit in the sense of receiving information in a matter of seconds from a variety of sources, not

just relying on the reports of the field officers. The process of decision-making is also widened, allowing individuals to engage in policy formation as team players and not necessarily according to their positions in the hierarchy of the foreign policy bureaucracy. At first glance, speed may be rendering redundant the work of field officers. Taking a closer look, one realizes that field officers perform the indispensable service of experiencing first hand local conditions, interpreting and analyzing information and taking into consideration cultural and historical sensibilities in reporting back to their foreign ministries at home. As former U.S. Secretary of State George Shultz has remarked, "information technology cannot replace solid diplomatic reporting" (Shultz, 1997). Speed also enables field diplomatic officers to coordinate better with headquarters and other branches of government in crisis situations. The other two characteristics—access to information and transparency—break down the idea that effective diplomacy is conducted behind closed doors and push diplomats to engage in public deliberations with other entities and be held accountable for their actions to global public opinion.

Information and communication technologies (ICTs) have also impacted the content, the organizational structures and the human resources of foreign policy bureaucracies. In terms of content, government organizations utilize the Internet to disseminate and receive information on various initiatives such as developing a foreign policy agenda, presenting data and other useful information to traders and investors as well as promoting a desired image of the country. In sum, governments engage in the business of designing web portals that appeal to targeted audiences of the global networked society like experts and activists in the foreign policy area, investors, exporters, and potential tourists to name a few. The ICTs have given rise to a new organizational form, the virtual embassy, a diplomatic post that can even operate from a hotel room with a professional diplomat whose computer connections enable him/her to carry out basic functions and communicate with headquarters back home. Additionally, ICTs encourage team-work among individuals working in hierarchical organizations including foreign bureaucracies. Video conferencing is widely used for the exchange of information and governments, like the Canadian, have on occasion created virtual task forces, connecting electronically their members to address and deal with a foreign policy problem (Smith, 1999). In terms of knowledge competencies, professional diplomats were up until recently classified as generalists or specialists and, depending on their area expertise, mastered two or more foreign languages. To adjust to the challenges posed by the information revolution, professional diplomats are asked today to supplement their knowledge base with management training and acquisition of computer skills.

Specific types of diplomacy seem to be exploiting and benefiting from the use of the web: traditional, economic and public diplomacy. Traditional diplomacy, whether in the bilateral or multilateral form, has used the web to advance foreign policy priorities, to facilitate the processing of documents and to even receive citizen feedback on important foreign policy initiatives. For example, Canada's Department of Foreign Affairs and International Trade (DFAIT) features on its website extensive coverage of the country's position on environmental issues and its strategy for sustainable development (Smith and Sutherland, 2002; Potter, 2002). In consular affairs, a number of countries like Denmark and Finland process through the Internet visa applications of foreign nationals. The interactive features of the Internet are more fully exploited in cases where governments or supranational entities like the European Union solicit the views of the public, either through chat rooms, discussion forums or web polls. A case in point is the websites that the Commission of the European Union and the foreign ministries of some member-states like Finland and Greece launched offering material and an online forum of discussion on the future of Europe. The Internet can also be used as a tool in the area of negotiations provided parties share common language and culture. Online meetings can be a cost-cutting and secure way to complete work on the preliminary stage of the negotiations but cannot be a substitute of face-to-face diplomatic negotiations (Kurbalija, 2002). Crisis situations involving humanitarian operations have attracted the research interest of the U.S. Institute of Peace (USIP), a federal organization funded by the U.S. Congress. Since 1995, USIP has been investigating under the Virtual Diplomacy Initiative how governments use information and communication technologies to respond and manage international crises (Brown & Studemeister, 2002). At the core of the initiative is the creation of a common culture of information-sharing and communication between civilian and military branches of government and between non-governmental organizations in carrying out humanitarian and peace operations. The technical term used for the task of information sharing is called interoperability: an electronic "handshake" that enables separate communication systems to share information among themselves towards a common end (Solomon & Brown, 2004).

Economic diplomacy is the second area that has benefited from the use of the Internet. Foreign ministries in collaboration with other government agencies and organizations representing the corporate sector, have created national websites that are replete with valuable information provided by economic counselors and attaches scattered throughout the globe for the benefit of

the countries' exporters and investors. Websites include a whole array of data like company profiles, business leads, trade fairs and events, investment opportunities, laws and regulations pertaining to foreign investment and trade finance arrangements. ICTs and the Internet can really make the difference in the conduct of public diplomacy, the practice of trying to appeal and influence another nation's public opinion or global public opinion. In an information-saturated world, projecting a favorable image of one's country to outside audiences (foreign media, politicians, business entrepreneurs, etc.) is considered a valuable intangible asset. States can draw upon their history, culture, political tradition and commitments to norms and values to craft, project and market a brand for themselves. Following the shift from geopolitics to postmodern image politics, the time is ripe for the emergence of a brand state, a state's concern of its image and reputation to the outside world (Ham, 2001). At the disposal of a brand state, the Internet can become a potent marketing tool and its interactive potential allows surveying segments of global public for image-monitoring purposes. Moreover, Internet facilitates dialogue, an indisputable aspect of communication for any state that engages in public diplomacy efforts (Riordan, 2004).

The information revolution has increased the power of more than 37,000 NGOs and countless social movements in confronting issues of global interest. The Net has enabled these global civil society actors to (a) interconnect on a global scale, (b) exchange and disseminate information, and (c) mobilize supporters into action. In the new communications environment, global activists have managed, by harnessing ICTs, to address and reframe issues, reverse government policies and even promote and help implement new diplomatic initiatives. Examples abound but the list of the most noteworthy cases includes the global anti-corporate protests regarding the Multilateral Agreement on Investment (MAI), the creation of transnational networks whose support for the Zapatista movement reversed the Mexican government's policy in the Chiapas region from a military to a political solution (Cleaver, 1995), support human rights activists granted to Burmese dissidents for human rights and political reforms in Burma and the Nobel Prize-winning international campaign to ban landmines that culminated in the signing of the Ottawa Treaty in 1997. NGOs expressed in February 1997 public opposition to the MAI on the internet and, along with other actions like letter-writing campaigns, petition signings and public protests, managed to bring in April 1998 negotiations to a halt (Kobrin, 1998). Internet became in 1994-1995 the alternative medium used by NGOs to make available to global public opinion material (letters, communiqués, electronic book, multimedia compact disk, etc.) that were not reported by media organizations. "By the end of 1994", as policy analysts contend, "a remarkable number of Web pages, e-mail listserves, and gopher archives had been created on the Internet" (Ronfeldt & Arquilla, 2001, p.183). Moreover, the Net was instrumental in forging connections among peace and humanitarian activists, feminists, and advocates for the human rights of indigenous people and impelled them to action (Cleaver, 1995). The Internet played a similar role in the early 1990s in disseminating information and mobilizing human rights activists and Burmese expatriates. The pro-democracy global campaign bore fruit as witnessed by the passing in 1996 of legislation in the U.S. State of Massachusetts barring companies doing business in Burma from signing contracts with the State of Massachusetts and the subsequent decision of major U.S.-based multinationals to withdraw from Burma (Danitz & Strobel, 2001). The International Campaign to Ban Landmines (ICBL) involved more than 1000 NGOs which collaborated with states to exchange information, mobilize public pressure, lobby governments and legislatures and draft a treaty prohibiting antipersonnel land mines. The ICBL, in existence since 1992, was a successful grassroots campaign that utilized the full potential of Internet tools, e-mail for internal networking and coordination as well as contacting government officials, web pages for diffusing information to activists, the press and policy-makers and fund-raising purposes. The ICBL is an apt demonstration of how global civil society actors, making ample and strategic use of the Internet, could seize the diplomatic initiative from governments, set and control the agenda and persuade states to join in a global policy coalition (Price, 1998).

In case the interests of NGOs clash with those represented by dominant actors such as states and transnational corporations, the internet provides to NGOs an electronic forum to express opposition to established views and an effective mechanism to mobilize people to take action on issues of global concern. NGOs have used the internet to diffuse information and forge global networks on issues ranging from the broad concerns of anti-globalization protests to the more specific issue of genetically modified foods. Melissa Wall (2002) has documented the use of the internet by NGOs around the world to challenge dominant discourses of the World Trade Organization (WTO) and to induce thousands of people to participate in the Seattle anti-corporate protest movement in December 1999. It is reported that an estimated 1500 NGOs signed the protest's declaration that was created online by Public Citizen (Tkalac and Pavicic, 2003, p. 498). Similarly, Jayne Rodgers (2003) demonstrates how international NGOs like Greenpeace and Friends of the Earth have utilized the interactive potential of the internet to raise awareness and prompt people to action against genetically modified foods.

The information and communication technologies have empowered NGOs and other actors of global civil society. The new communications environment, a byproduct of the information revolution, has had a profound impact on all areas of human activity including the practice of diplomacy. With the advent of ICTs, the content, organization and practice of diplomacy have been transformed and there is no way of grasping the changes yet to come as major technological breakthroughs unfold in record time before our eyes. At the dawn of the twenty-first century, a trend towards the de-coupling of diplomacy from its modern sovereign base is beginning to emerge with the aid of ICTs. Professional diplomats will have to share the diplomatic field with global civil society actors. Increasingly, the issues of diplomatic concern are global in scope and gain a global audience. The diplomatic game is becoming more complex, participatory and exciting.

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## KEY TERMS

**Brand State:** A state's concern with its image and reputation to the outside world.

**Diplomacy:** A regulated process of communication between at least two subjects, conducted by their representative agents over a particular object.

**Global Civil Society:** An arrangement of political interaction parallel to interstate relations that focuses on the self-conscious constructions of networks of knowledge and action by decentered non-state or sovereignty-free actors across national boundaries.

**Interoperability:** Technical and political compatibility and the sharing of a common culture of communication among separate communication systems.

**Net:** The global system of internetted computers, communications infrastructures, online conferencing entities, databases, and information utilities. The Net is comprised of a public (the Internet) and a private (private digital networks) digital space.

**Net Diplomacy:** Diplomacy associated with the emergence of a networked global society.

**Public Diplomacy:** The practice of trying to appeal and influence another country's public opinion and global public opinion.

**Soft Power:** The ability to achieve desired outcomes through attraction and persuasion rather than coercion. It works by convincing others to follow or getting them to agree to norms and institutions that produce the desired outcome.

# New Governance Strategies for a Government IT Policy

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## INTRODUCTION

How can a country's government be sure that e-government will, in turn, generate value for its citizens? Presently, nearly all governments understand the potential impact information technology has in reducing the costs of governmental operations as well as in delivering information and public services with greater opportunity, flexibility, and reach. Nevertheless, in fundamental aspects, such as confidence in public institutions, citizen participation, or quality-of-life standards, there is little evidence showing that IT has been able to create visible improvements.

The aforementioned observations force us to revisit the previous promises of e-government (OECD, 2003) and to rethink the current system of governance in order to turn these promises into reality. Indeed, this necessary reconsideration raises two important questions: First, how can we take advantage of the nature of governmental work and its consequent relationship with a country's citizens, and second, how should local and national governments, the private sector, a country's overall society, as well as its individual citizens cooperate and interact in an effort to ensure that e-government delivers the most important information and services to a country's citizens? Table 1 summarizes the main issues, questions, and ideas that will be addressed.

The answers to these questions may perhaps appear in new governance strategies that facilitate the development of IT public policies that comply with the promises of e-government. Table 2 summarizes the previous and current concerns of e-government.

*Table 1. E-government under scrutiny*

- The glitter of e-government is fading.
- The mere truth is that everybody needs e-government, but nobody demands it.
- There are unfulfilled promises of cuts in costs.
- We have e-government in spite of government.
- Everybody does e-government, so now what do we do as government?
- Taking the *e* out of e-government

*Table 2. What do we want?*

| **Yesterday** |
|---|
| Informatization of government information and services |
| E-service anywhere and anytime |
| Money |
| Self-leadership |
| **Today** |
| Things people need, Web based or not |
| Simpler and integrated services |
| No cuts to IT budgets |
| Leaders |

## FRAMEWORK OF GOVERNANCE FOR E-GOVERNMENT AND IT POLICY

To achieve the desired design, implementation, and evaluation of IT public policies required by e-government, certain criteria that enable the analysis and selection of such policies or initiatives need to be considered. First, policy strategies and objectives should be specified; initiative should be analyzed and aligned with the e-government program strategies and objectives. Second, regarding policy and public administration objectives, the initiative needs to be analyzed and aligned with the country's development, science, and technology strategies and objectives. Third, the initiative should be analyzed in the context of the instruments and tools of public policy (political, institutional, economic, and legal instruments). Finally, the initiative should be analyzed under the components of a governance framework (Norris, 2001). (The model follows this order: Generate and transfer knowledge for use in the decision-making process; put knowledge and decisions into action; facilitate change for the incorporation, acceptance, and application of concepts, models, initiatives, and projects; align the initiative to the higher order objectives and achieve political sup-

*Table 3. A summary of the components of an e-governance framework*

| |
|---|
| **1. Knowledge;** The generation and transfer of knowledge for use in the decision-making process |
| • Definition of issues |
| • Needs and solutions identification |
| • Knowledge management and information management (projects, good practices, technology; Canada Site, 2005) |
| • Continuous learning |
| |
| **2. Authority:** Put knowledge and decisions into action |
| • Mandate |
| • Organizational structures |
| • Regulations and legal framework |
| • Policy and guidelines |
| . |
| **3. Ownership:** Facilitate change for the incorporation, acceptance, and application of concepts, models, initiatives, and projects |
| • Decision-making processes |
| • Cost and benefit allocation |
| • Management of synergies, and win-win and zero-sum situations |
| • Identification of needs and interests |
| • Active engagement of participants |
| |
| **4. Internal Accountability** |
| • Strategic alignment and clear contribution to higher order objectives |
| • Performance evaluation |
| • Garnering of financial, institutional, and political support |
| |
| **5. External Accountability** |
| • External performance evaluation |
| • Inclusion of users' feedback |
| • Evaluation of take-up (Accenture, 2004) |
| • Transparency |
| • Citizen participation and engagement |
| |
| **6. Operations** |
| • Project-management techniques and tools |
| • Interinstitutional management of resources |
| • Cooperation mechanisms |
| • Technical and operational evaluation |
| |
| **7. Policy Instruments** |
| • Budget |
| • Nonfinancial incentives |
| • Legislation (laws, regulations, and norms) |
| • Mandates, decrees, orders |
| • Organizational structure |

port; open spaces for citizen participation and transparency; and facilitate the operation and implementation of the initiative.)

The new IT governance and regulatory framework strategy will help institutionalize e-government in part by formalizing existing structures. For example, in Mexico, the head of the E-Government and IT Policy Unit will become the more formal ICT coordinator general for the federal government, the E-Government Network will become the Executive Council, and informal groups of people interested in specific themes on e-government will be formalized as specialized technical committees (OECD, 2005).

Additionally, the IT governance and regulatory framework strategy will create new structures that will help broaden responsibility and ownership of e-government. Table 3 summarizes the governance framework components.

## TRENDS AND SOME GOOD PRACTICES TO FOLLOW

The current trend for e-government in the most advanced countries is to adapt strategies and models of governance, as illustrated by some comparative studies (INFOTEC, 2003, 2004; Nath, 2003).

The objective of these new governance strategies is to render the natural mechanics that exist between the work of the government and citizens more efficient, always trying to fulfill the potential of e-government. Additionally, these governance strategies are looking for help to clearly outline the coordination, collaboration, and cooperation mechanisms between the three levels of government—the private sector, civil society, and citizens—in order to ensure that e-government delivers information and services that are the most popular with citizens. In other words, these strategies will always include the necessary space for the gathering and understanding of citizens' worries, opinions, and needs, as well as the channels that will deliver answers most rapidly.

The experiences of these countries also serve to demonstrate which practices are best in terms of an organizational structure that successfully encourages the functional development of IT policies in government (E-Government Office of Brazil, 2005; E-Government Office of Canada, 2005; E-Government Office of Chile, 2005; E-Government Office of Colombia, 2005; E-Government Office of France, 2005; E-Government Office of Portugal, 2005; E-Government Office of Singapore, 2005; E-Government Office of the United Kingdom, 2005; E-Government Office of the United States, 2005). Table 4 shows some good practices to follow in order to have a better organizational structure for e-government.

There is strong demand from citizens and businesses for the government to improve transparency and anticorruption efforts, and many leaders believe that e-government provides a means of doing so. The Federal Law on Transparency and Access to Information, in combination with the use of ICT, in the case of Mexico has greatly

*Table 4. Organizational structure: Some good practices to follow*

**Establish a government CIO (chief information officer) department that will accomplish the following:**

- Direct and monitor the work of a high-level council of ministries as well as the work of other councils (executive and advisory council)
- Advise the members of the high-level (minister) council
- Manage and monitor the work plans and goals defined by the minister council, as well as provide input and reports of the programs defined by the council
- Develop, monitor, and control the application of IT policies in the federal government
- Coordinate the strategic ICT programs of the specialized committees and monitor the progress of transversal projects
- Mentor federal government CIOs on ICT policies and e-government program matters
- Make proposals on the establishment of specialized committees

**Establish as principal organ a high-level council (ministers) with the following mandates:**

- Define and periodically update the agenda of relevant ICT issues
- Establish priorities and strategic ICT and e-government programs
- Make mandatory ICT policies that are proposed by the executive secretary (office of the government CIO) and developed by the specialized technical committees

**Use the expertise of government agency IT leaders as well as experts from other sectors in a CIO council that will do the following:**

- Assess IT in the agencies of the federal government
- Provide input (best practices, experience, and solutions) for the specialized technical committees
- Monitor the specialized technical committees' work
- Promote intersectoral cooperation
- Approve projects and policies generated by the specialized technical committees
- Issue consensual recommendations on IT and e-government issues
- Discuss e-government agenda items with a pluralistic and interdisciplinary perspective
- Promote research on priority issues

**Establish specialized technical committees for priority issues of the ICT and e-government agenda with the following mandates:**

- Conduct specialized research on selected issues; results will be used as input for policies
- Trend analysis and definition of best practices
- Develop public policies in terms of ICT and e-government
- Coordinate and develop projects

extended the opportunities for individuals to interact directly with government. Yet, making information available online is only the first step toward transparent government, and there is now a need to make the information more accessible and easy to use.

E-government has helped improve the quality of government services in Mexico. For example, the citizens' portal puts all Mexican government information and services in a single place and tailors the information provided to different groups (e.g., for students, the elderly, children, businesses, etc.). Nevertheless, there are many constraints on demand, and little has been done to reorganize service delivery to put the citizen and the user at the centre (OECD, 2005).

Mexican government organizations are implementing e-government both in response to a top-down push for e-government (through the Good Government Agenda) and through an internal understanding of how e-government can improve transparency, efficiency, and citizen engagement. The top-down approach is driven largely by the priorities of the current administration, in particular, the goal of government reform. The individual drive from within organizations is based largely on a desire to improve trust in government (through increased transparency and citizen engagement) and the recognition of financial limitations that require increased efficiency (OECD, 2005).

## CONCLUSION

How can one be certain that e-government is able to generate value for a country's citizens? Undoubtedly, the promises of e-government will be accomplished if the IT public policies are better designed and implemented. Moreover, this will only occur if the policies are created and applied under a rigorous model of governance and supported by a world-class organizational system.

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## KEY TERMS

**Chief Information Officer (CIO):** The senior executive responsible for information management and information technology at the corporate level (Canada Site, 2005).

**E-Government:** The use of information and communication technologies, and particularly the Internet, as a tool to achieve better government (OECD, 2003).

**Governance:** The concepts, philosophy, and strategies that define the broad function of the government (Norris, 2001).

**Information Management (IM):** Integrating information standards, processes, systems, and technology to enable the exchange of information among providers and users in order to support the management objectives of an organization (Canada Site, 2005).

**IT Public Policy:** Governmental policies that make possible the operation of an e-government strategy (mandates, guides, and rules for IT management, use, procurement, and evaluation).

**Knowledge Management (KM):** Typically, the systematic management and use of the knowledge in an organization, or "the leveraging of collective wisdom to increase responsiveness and innovation" (Delphi Consulting Group, n.d.).

**Take-Up:** The full benefits of e-government will be realized only if citizens and businesses use it, but most governments still find themselves confronted with the challenge of low usage and the need for innovative methods to drive take-up (Accenture, 2004).

# New Media and Democratic Citizenship

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## INTRODUCTION

### Citizenship and New Media

The issue of the civic potential of the Internet has been at the forefront of much scholarly discussion over the last 10 to 15 years. Before providing a comprehensive overview of the different schools of thought currently dominating this debate, it is necessary to briefly describe how researchers have defined the terms *citizenship* and *new media*. Across different literatures, two ways of examining citizenship emerge. The first approach examines citizenship broadly as citizen involvement in the political process. Scheufele and Nisbet (2002), for example, identified three dimensions of citizenship: feelings of efficacy, levels of information, and participation in the political process. The second approach taps citizenship much more narrowly as social capital (i.e., the more emotional and informal ties among citizens in a community) (Shah, Kwak, & Holbert, 2001).

Depending on which definition of citizenship they followed, researchers also have been interested in different types of new media use with a primary focus on the Internet. Some have examined the Internet as a medium that functions in a top-down fashion similar to traditional mass media. These scholars mostly are concerned with how online information gathering differs from traditional media use, such as newspaper readership or TV viewing. More recently, scholars have begun to examine different dimensions of Internet use, including chatting online about politics, e-mail exchanges with candidates and other citizens, and online donations to campaigns.

### Cyber Optimism vs. Cyber Realism

In part as a result of these diverse sets of definitions, researchers of political communication have yet to come to a consensus about the practical uses of the Internet in promoting active citizenship. Some researchers, often labeled cyber optimists, suggest that this new medium can reverse waning levels of political participation, based on the assumption that users will access information and will coordinate political activism via the Internet (Bimber, 1998; Davis, 1999; Kaid, 2002; Rhiengold, 1993). Many of these scholars view the Internet as a vehicle for increasing political participation by means of educating individuals, measuring public opinion, facilitating communication with political actors, providing public forums, and making both registering for and participating in elections easier (Davis, 1999).

Conversely, other researchers suggest that the Internet's potential for civic renewal is limited, and that the Internet, at best, complements traditional media channels (Althaus & Tewksbury, 2000; Hardy & Scheufele, 2005; Johnson & Kaye, 1998; Margolis & Resnick, 2000, Margolis, Resnick, & Tu, 1997; Scheufele & Nisbet, 2002). Furthermore, some researchers have suggested that the Internet may negatively affect community involvement and may replace social interactions with solitary activities (Nie, 2001; Nie & Erbring, 2000).

## BACKGROUND

### The Effect of the Internet on Democratic Citizenship

This lack of consensus among political communication scholars is due, in part, to the nature of this new medium. As Jennings and Zeiter (2003) noted, "Trying to assess the political impact of the Internet … involves shooting at a moving target" (p. 311). That is, the rapid expansion of adoption of this new medium combined with the continual introduction of newer technologies that make the Internet more efficient result in a constantly morphing entity. Moreover, the civic consequences of the variety of different uses of the Internet have yet to be examined systematically and empirically.

Unfortunately, many of the existing empirical examinations of the role of the Internet in promoting citizenship are plagued by significant methodological problems. One problem is the attempts of many researchers to reinvent the wheel when it comes to operational definitions of Internet use. Rather than developing measures of Internet

use based on well-developed measures of traditional media use, for example, researchers have relied simplistically on time-spent measures instead of content- or channel-specific measures (Shah et al., 2001). Shah and his colleagues stated, "Studies on the psychological and sociological consequences of Internet use have tended to view the Internet as an amorphous whole, neglecting the fact that individuals make very different uses of this emerging medium" (Shah et al., 2001, p. 142). In other words, there has been a misguided focus on the online/off-line distinction in research that has examined the linkage between technology and citizenship. A study by Moy, Manosevitch, Stamn, and Dunsmore (2003) found that the online/off-line distinction has little explanatory power in examining the civic consequences of the Internet when controlling for specific dimensions of Internet use. Moy and her colleagues demonstrated that a time-spent measure did not have any significant effects on levels of civic engagement, when more specific uses of the Internet are included in an explanatory statistical model.

A second problem is the conceptualization of the Internet as a single dimension. Given the integration of technologies found within the medium (Bimber, 2000), users can access civic information, exchange electronic mail, chat about politics, and/or donate money to political campaigns by logging on to the Internet. These different communication acts and information exchanges could have very different civic consequences. For example, time spent searching information on governmental Web sites is different from time spent in political chat rooms arguing over normative political opinions. Bimber (2000) correctly stated that searching for "'the effects of the Internet' may become a conceptually muddled pursuit" (p. 330). Furthermore, seeking civic information online should not be considered a single act but should be differentiated between different types of Web site use (Hardy, 2004).

A third reason why empirical research has not yet come to a consensus about the practical uses of the Internet in promoting active citizenship is what Bimber (2000) calls "mutualism, the interdependence of new and old modes of communication in civic life" (p. 330). Most political intuitions now are using the Internet as a complimentary tool to traditional media instead of a separate entity. Simply put, political campaigns use Web sites as well as television commercials. Therefore, the Internet is becoming an integrated part of an overall media infrastructure instead of becoming an independent communication system. Researchers such as Scheufele and Nisbet (2002) have suggested that citizens who seek political information online are likely to be the same individuals that seek information from traditional media sources. In other words, the Internet is an additional source of political information that fits well into an overall media system; it is not an independent entity.

## CYBER CITIZENSHIP



### The Current State of Cyber Citizenship

Although much empirical research on the civic consequences of the Internet has been plagued with problems of conceptualization, there is a growing body of literature that has looked more closely at patterns of use instead of overall connectivity to the Web. Research suggests that political informational uses of the Internet encourage community involvement and political participation (Norris, 1998). A study by Hardy (2004) demonstrated significant pro-civic consequences of different types of information available on different types of Web sites. In this study, Hardy differentiated between primary-source Web site use and secondary-source Web site use. Primary-source Web sites were conceptualized as Web sites that are connected to governmental institutions, special interest groups, and political actors, while secondary-source Web sites were conceptualized as commercial news Web sources such as CNN.com or MSNBC.com. This study showed that primary-source Web site use was related positively and directly to levels of political participation but was not related to political knowledge. Secondary-source Web site use was related directly and positively to levels of political knowledge but was related indirectly to levels of political participation. The effect of secondary-source Web site use on political participation was mediated by political knowledge.

What these findings suggest is that citizens are using primary-source Web sites to retrieve mobilizing information only. Mobilizing information is information that "helps people act on attitudes they already have" (Lemert, 1981, p. 118). In advertising, mobilizing information is the address of the business, hours of operation, and other information that allow individuals to act. For example, if an individual is shopping for a new computer, an advertisement on television that gives the location of an electronics store allows the individual to act on his or her intention of buying a computer. In the realm of politics, mobilizing information would be information such as the time and place of a local meeting, location of polls on election day, contact information of political actors, and so forth. This information enables individuals to participate politically.

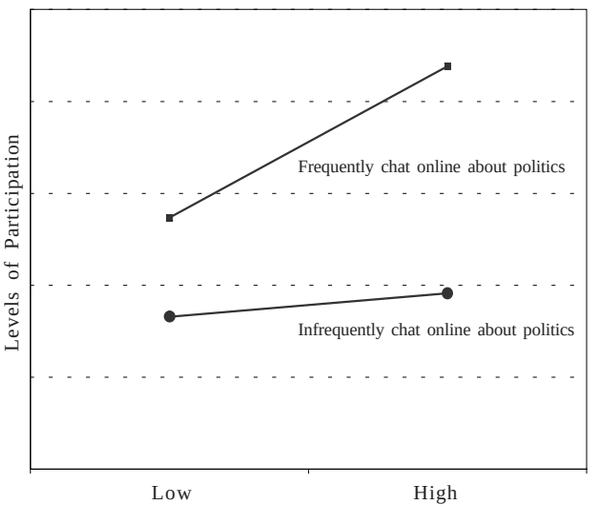
Therefore, individuals are visiting governmental sites to find mobilizing information, such as time and place of local meetings, which allows them to act on their intention of being an active citizenship. On the other hand, individuals are not using these governmental Web sites to find information about public issues and public policy; individuals use commercial news Web sites for that information.

Unlike traditional mass media, such as television, radio, and newspapers, the Internet provides not only a

resource of political information but also a forum for political expression (Dahlgren, 2000). The online forums of political expression can take the form of interpersonal discussion among citizens or direct contact with political actors and public officers. For example, Bimber (1999) examined citizen communication with government officials via electronic mail. His findings suggest that the lowered cost of communication associated with e-mail induced citizens with lower political connectedness or lower stakes in politics to assess this political activity as worthwhile. This suggests that the ease of contacting public officials via e-mail is encouraging political action by citizens that normally would not put forth such effort involved in using traditional forms of communication. Unfortunately, Bimber's (1999) study does not provide insight into the effectiveness of contacting public officials via e-mail. He hints that public officials are not as responsive to e-mails as they are to contact via phone and letters.

Unfortunately, very little empirical research has been conducted concerning chatting online about politics. In an analysis of America Online's chat rooms, Hill and Hughes (1998) found that "few actual issues or governmental policies are debated, with the norm being discussions of events and personalities" (p. 118). They also conclude that debates in chat rooms consisted mostly of normative statements that require little evidential backing, and thus political discussion in chat rooms provided or used little information. Therefore, the shared understanding of collective problems and highlights of opportunities for political involvement assumed to be brought on by political discussion may not happen in these open chat room environments. On the other hand, a few studies have found that chatting about politics online does promote active citizenship. For example, looking at the Internet as both a resource of information and a forum for political expression, Hardy and Scheufele (2005) examined the impact of political information seeking online and chatting about politics on levels of political engagement. This study found that both information seeking and chatting on politics were related positively and directly to higher levels of political participation. Along the same lines, a study by Shah, Cho, Eveland, and Kwak (2005) found interactive civic messaging and online information seeking to strongly influence civic engagement. However, more interesting are the findings of the Hardy and Scheufele (2005) study that suggested that chatting about politics helps individuals extract relevant information from online sources and promotes meaningful participation in the political process. That is, the effect of information seeking online on political participation is stronger for those who chatted more frequently online about political issues than those who infrequently or never chatted online about politics (Figure 1). This reasoning parallels findings about the interplay of traditional news use and interpersonal

*Figure 1. Political information seeking online, conversations about politics and political participation*




communication that showed similar patterns (Scheufele, 2001, 2002). In other words, the important role of interpersonal communication as a necessary condition for meaningful citizenship is relatively stable across media.

The common thread among studies demonstrating positive links between Internet use and active citizenship is that most of the behaviors that individuals do online are also the same behaviors that promote active citizenship off-line. For example, political interpersonal communication, be it chatting or face-to-face, has been shown consistently to impact the relationship between mediated information and political engagement. Chaffee (1972) wrote, "The more people talk with one another about information from mass media, the greater is the total impact of the media on social action" (p. 99). As previously outlined, research has shown that this relationship is relatively stable in the online/off-line domains.

## FUTURE TRENDS

### Will There Ever be a Cyber Citizen?

What all of this suggests is that the practical uses of the Internet in promoting active citizenship are the same practical uses of mass media and social environments found in the off-line world. Therefore, promoting active citizenship is a social, not a technological, activity. It is not inherent of the Internet to promote democracy. The Internet is a technological tool that motivated citizens

can utilize in order to find information and to be political expressive. However, the motivated individual can find information and be politically expressive without the Internet, as well.

The real question thus remains: Is it easier to be an active citizen online than it is off-line? Unfortunately, this brings us back to the somewhat fruitless online/off-line distinction that has plagued much of the previous research in this area. Future research now should look at individual political acts and if and how the costs of these acts are affected by the Internet. For example, donating money to a certain political candidate has become much easier with online donations. Success stories of the United States presidential campaign of 2000, such as John McCain's raising $415,000 through his Web site in 24 hours of his New Hampshire primary victory (Melillo, 2002) and Bill Bradley's reputedly raising $3 million on his site (Political Campaigns Discover Online Advertising, 2000) were just precursors to Howard Dean's success in the 2004 presidential primaries. All of these cases suggest that active citizens, indeed, are finding the activity of donating money to political campaigns easier via the Internet. As more technological advances are incorporated into the Internet, other civic activities such as participating in public meetings, mobilizing rallies, and voting may become easier. Researchers then should examine the impact of the Internet on these specific activities.

## CONCLUSION

Unfortunately, there is no reason to be overly optimistic. The Internet is merely a tool that can allow us to improve communication among different groups in society, such as communication among citizens and between citizens and policymakers. The Internet also can streamline processes, such as fundraising, campaigning, or systematic deliberation. As seemingly obvious as these statements may be, it is important to keep in mind that the Internet does not have magical powers that will turn apathetic citizens into active citizens. There is much research that suggests that active citizens off-line are the same active citizens online (Althaus & Tewksbury, 2000; Bimber, 2001; Scheufele & Nisbet, 2002). Or, as Bimber (2001) put it, "Having access to the wealth of political information and communication available through the Internet is not by itself connected with participation" (p. 61).

However, the Internet is not in a static state. It is a medium and a communication environment that is constantly changing. The civic consequences of the Internet are likely to change continually as more individuals go online and as more technological advances are incorporated. It is also reasonable to assume that cohort changes over the next decades also will bring about changes in the role that the Internet plays in democracies. Jennings and Zeitner's (2003) findings, for instance, suggest that a key determinant of the civic consequences of the Internet is the "intersection between the stage of individual political development and incorporation of the Internet into one's media repertory" (p. 331). Thus, as newer generations in the population mature, projections and findings of the civic role of the Internet in a democratic society will need to be reexamined continually.

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## KEY TERMS

**Cyber Citizenship:** Active participation in democratic life in which an individual accepts and exercises his or her rights and responsibilities in society using the Internet as the main means for political participation.

**Cyber Optimist:** An individual who believes that the Internet can reverse waning levels of political participation.

**Cyber Realist:** An individual who believes that the Internet will not reverse waning levels of political participation and that the Internet is just another piece of the overall media infrastructure.

**Democratic Citizenship:** Active participation in democratic life in which an individual accepts and exercises his or her rights and responsibilities in society.

**Mobilizing Information:** Information that enables citizens to be politically active.

**Mutualism:** The interdependence of new and old modes of communication in civic life (Bimber, 2000).

**Online/Off-line Distinction:** A distinction between individuals who access the Internet and those who do not. Often found in research when examining the political impact of the Internet.

**Primary-Source Web Sites:** Web sites that are connected to governmental institutions, special interest groups, and political actors.

**Secondary-Source Web Sites:** Commercial news Web sites.

# Non-Technical Risks of Remote Electronic Voting

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## INTRODUCTION

A few years ago, remote electronic voting seemed like a good idea for the near future. Globally, voting turnout figures are dropping dramatically (Electoral Commission, 2002) and politicians are therefore trying to find ways to increase civic participation. One solution is to make the voting process more convenient by giving voters the opportunity to submit their governmental election ballots over the Internet from home or work, or through their mobile phones using SMS. In this way, people will not have to leave the comfort of their homes or their work routines to have their voices heard. What a great boost this would be for our Western democracy! Citizens who live overseas, housebound people, or business travellers, everybody could use a computer to cast a ballot online. However, we will argue in this article that for several reasons remote electronic voting does pose a real challenge for e-government and might not necessarily be the best way forward.

## BACKGROUND

Many politicians and legislators are in favour of this new voting technology. They expect it will bring convenience to the voters, may increase turnout among the young, may result in cheap, efficient vote counting, and may reduce the incidence of human error (Dictson & Ray, 2000; Mohen & Glidden, 2001). Technological development of electronic voting is stimulated by national governments, and also in the context of the European Union (EU) Framework Programs.[1] On the other hand, opponents of Internet voting claim that besides large security risks, and the lack of equal access to the Internet for all citizens, it is not the voting *method* that matters. Low turnout is perceived as a symptom of a deepening crisis of democracy. Widespread indifference to, and ignorance of politics, is causing an evaporation of the concepts of citizenship and participation (Eliasoph, 1998). Previous reforms to make voting more convenient have had little effect on turnout levels and virtually none on the composition of the electorate (Internet Policy Institute, 2001). In our own research in which we examined a series of experiments with e-voting and e-polling, we did not see any positive influence on voting turnout. In four different sites a series of three e-polls took place, and in each case, we saw a declining turnout, suggesting that the effect of new technology on turnout is at best only temporary (Van den Besselaar, Oostveen, De Cindio, & Ferrazzi, 2003).

Nevertheless, even without affecting voting turnout, e-voting and e-polling technologies are of great importance. In order to clarify the opportunities and risks for democratic processes, we studied some 15 experiments with an e-voting system. The conclusion is that "voting in your underwear" (Arent, 1999) does not seem a valid option—at least not at this moment. Various technical, organisational, and behavioural issues are at stake. We discuss the main issues here.[2] We focus mainly on remote e-voting, but several of the risks discussed are also relevant for e-voting in a polling station using a voting computer, and for other (nonelectronic) forms of remote voting, such as postal voting.

## SECURITY AND VERIFIABILITY

Many people are concerned about the *security of remote voting* (Harris, 2003; McGaley & Gibson, 2003; Rubin, 2000). When people use computers from home or work, the machines are never as secure as the voting machines used in supervised kiosks or polling stations. Personal computers might be more vulnerable to hackers, denial of service attacks, viruses, or phantom Web sites which are used to divert voters (Kohno, Stubbefield, Rubin, & Wallach, 2003). Another problem with the use of personal computers at home or work is that the *requirement of verifiability* becomes very difficult to realize (Mercuri, 1993). Internet voting systems pose a problem in that the tallying process is not transparent. Voters should be able

to see that their votes are tabulated correctly. The best way to do this is to provide a voter-verifiable physical audit trail (Mercuri, 2001). If citizens do not trust that the elections they participate in are fair and that the votes are counted correctly, then they may not accept that the final votes represent their opinion. At polling stations the voting system could provide such a voter verifiable audit by printing a permanent paper record of each vote. In case of any doubts about the results of the election, there is then the possibility of a manual recount of these paper ballots (McGaley & Gibson, 2003). However, voting computers often do not have this facility, which makes recounting impossible—also in the polling station. If we switch from e-voting in the polling station to Internet voting from home, this becomes an even more serious problem: the paper trail is then impossible.

Yet, technical vulnerabilities are not the only threats to the security, integrity, and secrecy of Internet ballots. Social issues also play a very important role. Voting systems should guarantee a democratic election which is free, equal, transparent, and secret. However, *remote* e-voting cannot guarantee any of these criteria. This article will give an overview of five nontechnical reasons why we think (remote) e-voting poses a real challenge for e-governments around the world (Oostveen, 2006).

## FREE AND SECRET VOTING

In a recommendation report written by the Council of Europe (2004), five basic principles of democratic elections and referenda are specified. Elections need to be universal, equal, free, secret, and there should be direct suffrage. These principles apply to traditional voting as well as to new voting methods. With e-voting the voters must be identified by the system; the tallier must be able to distinguish the votes cast by valid voters from those cast by voters who are noneligible. At the same time the votes must remain anonymous and secret. No one should be able to determine how any individual voted, and voters should not be able to prove how they voted because this would facilitate vote selling or coercion. Remote e-voting increases the risk of coercion of the voter by, for instance, a dominant spouse, the teacher at school, or the boss in the office.

Our research shows that the possibility of coercion is a real concern among voters (Oostveen & Van den Besselaar, 2004). We organised 12 focus groups and one online forum in four different countries with voters and organisers of ballots (pollsters). We ensured that there were vast differences in the socio-demographic makeup across the respondents in each of the focus groups, including age, gender, income, and ethnicity (further details in Oostveen & Van den Besselaar, 2004; Oostveen, 2006). The greatest risk of e-voting, according to the majority of the panellists, is the possibility that a voter can be forced by someone else to vote for a certain alternative. An Italian voter pointed out: "At first I thought it was a good idea, but now I fear the influence and pressure that family members could exert on voters." With remote voting there will never be the same privacy that a voting booth provides.

This phenomenon of "family voting" is also possible with other voting technologies. Husbands could accompany wives into the polling booth, and this indeed is also a real problem in many cases. However, appropriate regulation may prevent this from occurring, because voting in a polling station is in the public domain and therefore controllable. Postal voting makes coercive family voting also a possibility. As is often argued, the education of voters and a stable political situation may heavily reduce the risks of family voting. In our view, however, the voting system should be robust also in periods of political tension. Therefore, postal voting does not seem to be a good idea either.

Remote electronic radicalizes this problem. Our research shows that many voters do not trust that their privacy is guaranteed in e-voting systems. And these voters feel that surveillance may alter their voting behaviour, as our research indicates (Oostveen & Van den Besselaar, 2005). Here, there is a need for additional research and experimentation before deciding about the deployment of the new voting technology.

## DIGITAL DIVIDE

E-voting has to deal with an existing digital divide, in which there is an upper-class bias (Alvarez & Nagler, 2000; Phillips & von Spakovsky, 2001). This digital divide can be expected to influence the participation in, and the outcome of, ballots. According to many observers the digital divide is declining, yet this is generally measured in terms of *access* to the Internet. However, divides may be much more subtle and related to skills required to install the software and hardware, learning, social networks that provide help, ownership of advanced versus older types of computers, insights into the security and risks, and so on. From the literature we learn that despite the narrowing of the "digital divide," Internet connections are still not distributed evenly across racial, gender, age, regional, and socioeconomic lines. This applies even more so for the skills needed to use the technology (Wellman & Haythornthwaite, 2002). Demographic groups with less access and less familiarity in using computers might find some types of e-voting difficult or intimidating. There-

fore, government may be making it easier for some people to vote, but not for others. In the end, e-elections may be even less representative than traditional ones (Alvarez & Nagler, 2000). In our own study we saw considerable differences in the frequency of use of ICT (Oostveen, 2006). This frequency of using ICT is related to the amount of difficulties with installing and using the system. We, therefore, cannot assume that every citizen has equal access to e-voting possibilities.

Although most of the voters involved in our research would be willing to use e-voting systems themselves, they are of the opinion that remote e-voting should only be used as one alternative voting method. According to the respondents, such a system cannot be used exclusively. One respondent remarked: "The middle class will be more likely to have a computer, but the working class will not. So it will enhance the vote of those middle-class people." The voters also fear that e-voting will discriminate against older voters because of their limited experience and knowledge of computers. It was said: "Yeah … the older you are, the less willing you are to change and it will discourage elderly people from voting" and "Older people panic about computers and will be put off from voting."

The organisers of the ballots emphasised that e-voting should not replace the traditional voting systems in the near future, as it may exclude from participating, groups who are able to use the traditional ways of voting. This is a legitimate claim, and politicians in favour of e-voting do generally agree with it. However, the prospect of saving money is often dominant in the introduction of e-voting, and the inclination to keep expensive parallel systems alive may therefore in practice be low. Experiences in other sectors support this. Whereas, for instance, the credit card was introduced as an additional means for paying bills, transactions have increasingly become exclusively related to credit cards, such as reserving a hotel room or renting a car. And e-voting in the polling booth has replaced paper voting completely in the Netherlands: so there is a clear tendency of new voting technologies replacing older technologies. This may also be the case in the future with remote voting.

## CULTURAL EFFECTS

A third issue that comes into play when people do not vote from a polling station is the erosion of the "civic ritual" of physically casting a vote in a location where members of the community gather (Dictson & Ray, 2000). The loss of the civic ritual is commented upon in many academic articles about e-voting. Critics argue that it would make elections less of a community event, which might create a greater gap between citizens and government, thereby decreasing participation. What some people believe is that voting is more than the simple act of indicating one's political preference; it is a vital public ritual that increases social solidarity and binds citizens together (Mohen & Glidden, 2001). Of course, as is often argued, modern society shows a tendency toward individualization, and remote electronic voting fits into this tendency. However, it is a normative issue whether one wants to reinforce or counteract this fragmentation of society by selecting appropriate technologies.

Our interviews indicated that the loss of the actual ritual of voting is indeed something to consider (Oostveen & Van den Besselaar, 2004). The pollsters are very concerned about the loss of the "civic ritual" of casting a ballot and consequently the loss of the importance and the value of voting. Their fear is that the system could be considered "too cold" by the voters. The pollsters voiced their concern that the loss of the civic ritual could decrease the significance related to voting and hence overall turnout. They go even further by pointing out that making the current voting procedures easier might produce an increase of "spread ignorance," that is, an increase of "superficial behaviour" and/or a growing oversimplification of voting behaviour. As e-voting may destroy the civic rituals it can have a negative influence on the political culture and therefore is best avoided. The voters' focus groups also identified traditional voting procedures as a ritual that should be preserved. A respondent remarked: "For elderly people traditional voting is often a kind of important tradition." The representatives of a trade union that piloted the system also articulated that the use of remote e-voting would negatively influence the internal communication and formation of opinions within the organisation.

## ORGANISATIONAL ISSUES

A fourth important issue is the logistics of organising a remote e-ballot. The process of registering, distributing hardware and software, organizing help desks and other forms of support for voters, is a complex and difficult task. It requires planning of activities of various institutions and actors (for instance, the organiser of the ballot, the certification authorities, and the "supplier" of the e-voting service).

Our research showed that limited resources and budget have an impact on the success of organising a ballot and increasing turnout (Oostveen, 2006; Van den Besselaar et al., 2003). Public relation materials, translation of documents, and support all require a substantial amount of money. Changes, especially those involving new technologies, are intensive users of resources which

are often scarce in many organisations. Because we think that e-voting systems have particularly great potential in local organisations, trade unions, community networks, and other contexts where it is more difficult to devote resources to voting and polling than in traditional elections, special attention to the issue of resources is required. Many potential users of e-voting technology will have to use it with relatively low resources. Other organisational problems encountered had to do with the large number of actors involved in the project. As various actors play a role such as the organiser of the ballot, the certification authority, and the e-voting service provider, the complexity of organising e-voting is a serious issue that needs further attention.

Furthermore, a change or a lack of personnel, and difficulties in distributing the materials were other organisational issues that came up during the field experiments. We would like to highlight the problem of distributing the materials (hardware, software, documentation). It would be tempting to assume that distributing materials to the voters can only be a problem in a small-scale pilot study. A lot of time, effort and planning need to be invested to ensure that a pilot, or indeed a real e-ballot, runs smoothly. This did not only prove to be the case in our project but also in other larger pilots. One example from the United Kingdom illustrates this. On June 10, 2004, the UK government embarked on the largest experiment in postal voting. During the European and local elections in England, about 14 million voters in the East Midlands, North East, North West, and Yorkshire and the Humber had to vote by post. There were no normal polling stations in those areas. Thousands of ballot papers were not delivered on time. In some cases printers missed the deadline to get the papers to the Royal Mail. Other problems included misprinted ballot forms. Technical issues were blamed for delays by one of the 12 printing contractors, while the illness of a managing director has been blamed for delays at another company. This example illustrates that even at high-stake, well-financed elections, the distribution of materials and problems with personnel can have disastrous results with people being denied the opportunity to vote.

We do not want to suggest that it is impossible to organise a large-scale e-election; however, the examples of successful experiments can easily be matched by counterexamples.

## BEHAVIOURAL EFFECTS

Finally, we pay attention to the social psychological issue of social identity (Ellemers, Spears, & Doosje, 1999; Tajfel, 1978) in relation to remote e-voting. The main difference between remote e-voting and traditional voting is that remote e-voting can be done in the privacy and security of one's own home rather than at a polling station in the community. The social psychological implications of this have been paid little attention hitherto. One important implication of e-voting is that when one votes at home, isolated behind the computer terminal, a more individual level of identity (and more individual self-interests) is likely to become salient compared to when one votes in the community hall, surrounded by other people from different groups and backgrounds or at work surrounded by colleagues. In the latter two cases, collectivist and even multicultural concerns may be more salient. Research shows that people's social identities have a very powerful impact on their perceptions, emotions, and behaviour (Ellemers, Spears, & Doosje, 2002). As Andrew Brader (2001, p. 4) points out, "people act in ways specific to their situation."

Different voting contexts not only influence which identities and interests are made salient, they can influence behaviour relating to these identities and interests for *strategic* reasons. For example, being confronted with different groups of people at the polling station (or on the way to it) may make one feel more accountable to these audiences (e.g., ethnic minorities, the poor) than when at home on one's own, or surrounded by one's family. When group members define themselves in terms of their collective identity they focus on the similarities between themselves and fellow in-group members with reference to experiences, needs, interests, or goals. As a result "my" and "your" experiences, needs, and so forth are transformed into "our" experiences and needs (Stürmer & Kampmeier, 2000, p. 107). This is particularly likely to affect voting behaviour when this is identifiable (and thus accountable) to an audience that might disapprove. For example, many preelection polls underestimate self-interested or right-wing preferences, because they fail to take into account that people might not want to admit to such preferences in public. Contexts in which people perceive there is scrutiny of their choice may, therefore, affect voting for strategic or self-presentational reasons. Examples of a high-accountability context are votes that are conducted in public (e.g., in mass meetings with a show of hands), rather than by private ballot. Although e-voting may seem private, one of the concerns associated with this technology is whether it is indeed secure, or open to "surveillance" by those administering the system. The perception of surveillance may moderate voting preferences perceived to be critical of such authorities.

Another factor that may well cause features of e-voting to influence voting preference is the degree of social interaction and discussion around political topics prior to voting. Voting from the home increases the likelihood that choices will be discussed within a limited and

homogeneous group context, whereas voting in the community may open the voter up to disparate social influence from others, especially those relating to more prosocial or collectivist concerns. This process of validating views through discussion has been called group consensualisation (Haslam, 1997). Because discussion is likely to polarise in line with group norms and identities (Spears, Lea, & Lee, 1990) the parties to discussion can be highly influential.

Our own field experiments support the expectation that voters' social identity varies in different situations (voting in polling booth, voting from home, etc.) and that the voting media may have an effect on the voting outcome (Oostveen & Van den Besselaar, 2005).[3] Of course, we are not claiming that political preferences will be entirely determined by the voting context. However, these contextual effects may be especially important in the case of "floating" voters who often decide elections.

## CONCLUSION

We saw in this article that introducing new technology is always a complex undertaking which has many different aspects. These aspects are technical, as well as social, political, organisational, and behavioural. Historically, social aspects and democratic values have only been partially considered in the systems design process; the main focus has been on technical and economic factors. The five nontechnical issues we have addressed here may affect the final outcome of the elections and the political representation of the votes cast and should therefore not be neglected by politicians, legislators or researchers.

E-voting is a relatively new innovation and *remote* e-voting systems are in the first stages of development. Therefore, we are only beginning to clarify many of the important issues. However, it seems clear that many experiments are necessary, in both small- and large-scale environments, in order to develop the technology in a responsible way.

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## KEY TERMS

**Civic Ritual:** A ritual is a formalised, predetermined set of symbolic actions generally performed in a particular environment at a regular, recurring interval. The general purpose of civic rituals is to engage a group of people in unified action to strengthen their communal bonds.

**Digital Divide:** The digital divide is the disparity in access to technology that exists across certain demographic groups. The digital divide exists between those in cities and those in rural areas. The digital divide also exists between the educated and the uneducated, between economic classes, and globally, between the more and less industrially developed nations.

**Electronic Voting:** E-voting is an election system that allows a voter to record his or her secure and secret ballot electronically. Electronic voting includes voting using a punch card, optical scan, or computer in a kiosk, or by using the Internet or (mobile) telephone.

**Privacy:** A system is private if neither election authorities nor anyone else can link any ballot to the voter who cast it, and no voter can prove that he or she voted in a particular way.

**Remote Electronic Voting:** Remote e-voting is an election system that allows a voter to record his or her ballot electronically from home, work, or school, instead of using a supervised polling station or kiosk.

**Social Identity:** Having a particular social identity means being at one with a certain group, being like others in the group, and seeing things from the group's perspective. In other words, people behave by acting in concert within a group with which they identify.

**Verifiability:** A system is verifiable if anyone can independently verify that all votes have been counted correctly.

## ENDNOTES

1 However, this is also part of a general techno-economic policy to stimulate the deployment of the information highway, in order to get the e-society going.

2 More details about the methodology and results of our research can be found elsewhere: Van den Besselaar et al., 2003; Oostveen and Van den Besselaar, 2004, 2005; Oostveen, 2006.

3 Not much research has been conducted on this topic. One other study by Christin and Trechsel (2005) suggest that e-voting is neutral. These contrasting results show that more research is needed.

# Online Citizen Consultation and Engagement in Canada

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## INTRODUCTION

Like other western liberal democracies, Canada has witnessed the erosion of political participation and civic engagement on the part of its citizens. Recent studies of Canadian democracy have revealed numerous symptoms of malaise, including declines in voter turnout, participation in traditional political institutions, civic literacy, and trust in government (Gidengil, Blais, Nevitte, & Nadeau, 2004; Nevitte, 1996). Governments at the federal, provincial, and municipal levels have launched numerous democratic reform initiatives in response. Along with proposals for electoral and parliamentary system reform, governments in Canada have responded with new *citizen consultation* initiatives designed to increase public participation in the policymaking process. Incorporating the use of new information and communication technologies (ICTs) into these initiatives, such as online citizen consultation tools, has become a common method used to engage Canadians in the policymaking process. A gradual shift in the language and practice of citizen involvement in the policymaking process has also been taking place, one in which citizen consultation is being complemented by richer and more sustained forms of *citizen engagement*. This chapter examines the political context and conceptual underpinnings of online citizen consultation and engagement in federal policymaking in Canada, reviews a number of recent examples, and assesses their outcomes in light of their potential to overcome the democratic malaise currently ailing Canada's political system.

## BACKGROUND

Citizen consultation has been an increasingly common feature of the policymaking scene in Canada since the 1960s. In the early 1990s, however, following popular repudiation of two major constitutional agreements negotiated by political elites, it became clear that Canadian citizens' demands for more meaningful opportunities to participate in policymaking were increasing, even as they were becoming alienated from traditional avenues and institutions of participation such as political parties and elections. Nevitte (1996) suggests that these demands stem, in part, from the democratization of higher education in the post-WWII period, as a result of which Canadian citizens have become less deferential and more "cognitively mobile," thus narrowing the knowledge-skill gap between citizens and political elites. New ICTs, including the Internet, have also facilitated citizens' access to policy-relevant information and news. Canadians increasingly believe that they are knowledgeable about national issues, and they are becoming less willing to leave policymaking and governing up to public officials whom they may not trust. The federal government responded in the late 1990s by introducing new mechanisms for citizen input into a number of areas, including social policy, health care, and rural issues (Patten, 2001; Phillips & Orsini, 2002).

Phillips and Orsini (2002) have described a gradual shift in the federal government's approach to involving citizens in the policymaking process. In the 1960s, governments began to hold *citizen consultations*—hearings, town halls, and so forth—as a way to involve citizens in the policy process outside of elections. Such consultations tended, however, to be state-centered, with government framing the issues and dictating agendas. The purpose of such consultations was typically to obtain information from citizens and to notify them of pending government action. Unable to influence agendas and uncertain about the influence gained through such exercises, citizens became suspicious of and impatient with such forms of consultation over time.

The concept of *citizen engagement* has emerged in the last half decade in Canada as governments have pondered newer, more meaningful models of citizen involvement. Phillips and Orsini (2002) define citizen engagement as involving "interactive and iterative processes of deliberation among citizens (and sometimes organizations) and between citizens and government of-

ficials with the purpose of contributing meaningfully to specific public policy decisions in a transparent and accountable way" (p. 3). Citizen engagement is intended to be less state-centered than traditional consultation by embodying both government- and citizen-convened involvement processes. More importantly, Phillips and Orsini (2002) stress,

*it emphasizes the importance of genuine two-way dialogue among citizens, and between citizens and governments [...]* Citizen engagement would thus exclude many instances of public consultation *because the latter does not produce a genuine dialogue, nor does it give citizens much real influence over policy outcomes.* (p. 3-4, emphasis added)

Citizen engagement is closely related to the theory of *deliberative democracy*, as elaborated by political theorists like Jurgen Habermas and James Fishkin, and as implemented in *deliberative dialogue* exercises by governments and third-party organizations (Fishkin, 1991). Deliberative dialogues bring together diverse groups of citizens to engage with experts, policymakers, and each other on major public policy issues of the day. In face-to-face deliberative dialogues, citizens "consider relevant facts and values from different points of view, work together to think critically about options and expand their perspectives, views, and understandings." (MacKinnon, 2004, p. 4). Deliberative dialogues show more potential than traditional consultation to stimulate citizen engagement (Saxena, 2003).

The Government of Canada's interest in increasing citizen consultation has also been driven by developments in public sector uses of new ICTs, especially as the concept and practice of *e-government* has achieved acceptance. In the late 1990s, new ICTs were embraced by Canadian parliamentarians and public servants as means to improve service delivery and to communicate and consult with the public and organized interest groups (Centre for Collaborative Government, 2002; Malloy, 2004; Richard, 1999). In addition to the anticipated administrative and service delivery benefits, the government portrayed its *Government Online* (GOL) initiative as offering an antidote to the civic malaise gripping the country. In terms of providing information to citizens and offering them more access to policymakers and the policymaking process, the federal government has achieved some impressive results thus far. A vast quantity of online information has been put at the disposal of Canadian citizens, who have in turn embraced the effort. The Canada Site (http://www.canada.gc.ca), the government of Canada's main Internet portal, provides access to over 450 federal Web sites and millions of pages of documents and information on government programs and services, and was visited by roughly 16 million unique users in 2003 (Public Works and Government Services Canada, 2004a). The Parliament of Canada maintains a legislative Web site (http://www.parl.gc.ca) that allows citizens to monitor the status of bills and the work of the various legislative committees of the House of Commons and the Senate. Individual parliamentarians have begun to establish a significant Internet presence as well, with 58% operating Web sites, many of which offer interactive tools for constituents to communicate with Members of Parliament via online feedback forms and surveys (Centre for Collaborative Government, 2002).

## ONLINE CONSULTATION AND ENGAGEMENT IN CANADA: POLICY AND PRACTICE

As in many other jurisdictions, the Canadian government's use of the Internet and related technologies to engage and consult with citizens is at the developmental stage, with most projects being undertaken on a pilot or experimental basis. Nevertheless, in addition to using the Internet to provide citizens with information, the federal government has begun to use a variety of online tools to solicit policy feedback from citizens and, in some cases, to provide opportunities for citizens to engage interactively with officials, politicians and each other (Public Works and Government Services Canada, 2004b). The Privy Council Office (PCO) is the government agency responsible for online consultations. The PCO has prepared guidelines for online consultation and engagement. Some of the advantages of online consultations identified by the PCO include the ability to reach traditionally inactive portions of the population such as rural communities and youth, and the more flexible mechanisms of participation that the Internet offers busy Canadians. While government-wide policy and practice on using the Internet for public consultations remains elusive, various departments and agencies have used a number of online tools to solicit and gauge public opinion and reaction to policy initiatives. Online consultation tools currently in use by federal departments include e-mail, online surveys, interactive workbooks, discussion forums, and content management systems. In 2003, the Department of Canadian Heritage, along with the PCO, launched a Web site entitled "Consulting Canadians" (http://www.consultingcanadians.gc.ca). The site is a consultation portal where citizens can find structured lists of consultation exercises taking place (on and off-line) across the country.

Online consultations in Canada can be classified according to the distinction between *online feedback* and *online discussion* (Public Works and Government Ser-

vices Canada, 2004b). The former provides opportunities for citizens to offer feedback and input on a particular issue via e-mail or online surveys and workbooks, usually in response to a policy discussion paper or series of proposals released by the government. In the latter case, the online consultation includes opportunities for citizens to interact and engage not only with government but with *one another* in online discussion and debate. In the words of a recent government report: "online discussion based consultations provide opportunities for the public, or selected representatives from particular interests or communities, to join a conversation, share ideas, collaborate on projects and build relationships through electronic communication" (Public Works and Government Services Canada, 2004b). Online feedback, according to Phillips and Orsini's conceptual distinction, falls under the category of consultation, whereas online discussion corresponds more closely to engagement.

The following highlights some of the more noteworthy and ambitious examples of online consultation and engagement recently initiated by the Government of Canada. They vary widely in scope, inclusiveness, technologies used, degree of feedback versus discussion enabled, and the number and representativeness of participants. Some have been highly successful, while others have achieved only modest or even disappointing results.

- **Agriculture and Agri-Food Canada:** Launched The Rural Dialogue in 1998, a series of country-wide face-to-face and electronic consultations designed to canvass public opinion and engage rural publics on issues of concern. The major online component of the Dialogue was the Rural Dialogue Online Discussion Group, enabled by a listserv dedicated to citizens from rural and remote regions for the discussion of issues relating to rural Canada. (http://www.rural.gc.ca/listserv_e.phtml)
- **Status of Women Canada (SWC):** Launched an electronic roundtable discussion via an e-mail list in May 2000, as part of its consultation process seeking input from women's groups on a UN "Beijing +5" document. The electronic roundtable attracted 60 participating individuals and organizations. Roughly 130 postings to the list were made over an eight week period.
- **The (Romanow) Commission on the Future of Health Care in Canada:** Conducted an extensive series of public hearings and consultations on the future of health care in 2001-2002. In September 2001 the Commission launched a Web site (http://www.healthcarecommission.ca/) containing a variety of resource materials related to the Commission's work and public hearings. The site received over 36 million visits by the time the Commission's final report was released. Site visitors also completed over 16,000 online consultation workbooks examining various issues and options in health care (Commission on the Future of Health Care in Canada, 2002a).
- **Industry Canada (IC):** Initiated a nation-wide "engagement process" on a federal Innovation Strategy announced in 2002. After releasing two major discussion papers, the government convened thirty-four regional consultation meetings to gather public input and responses. In addition, over 30,000 e-mails were sent out inviting interested individuals and key stakeholders to participate, and directing them to fill out and submit an online consultation workbook. The electronic component of the consultation was a major failure, however, as only 600 responses and a mere 130 workbooks were received.
- **Department of Foreign Affairs and International Trade (DFAIT):** Initiated a Foreign Policy Dialogue (FPD) with Canadian citizens from January to May, 2003, which included a significant online component, in addition to town halls, expert roundtables, a youth forum, and other off-line venues. The FPD Web site (www.foreign-policy-dialogue.ca) consisted of two main sections: in one, citizens were invited to respond to a set of questions raised in a discussion paper; in the other, a discussion section, citizens could participate in a less-structured set of forums where they debated foreign policy issues with one another. The FPD site received almost 1.5 million hits and was visited by more than 62,000 unique users. Over 2,000 messages were posted to the discussion forums, and the discussion paper was downloaded over 28,000 times (Site statistics: Jeffrey, 2003).
- **House of Commons Sub-Committee on the Status of Persons with Disabilities:** Conducted an online consultation on the Canada Pension Plan Disability program between December 2002 and March 2003. The consultation Web site received over 15,000 visits, and roughly 1,400 individuals responded to a series of issue polls and/or to the site's invitation to share stories or present solutions.
- **Department of National Defense:** Conducted an online public consultation in the summer of 2002 as part of its Defense Program Update, a review of national defense priorities and capabilities. Over 17,000 submissions were received, overwhelmingly from members of the military and their families.

## CASE STUDIES

While a number of the examples of online consultation and engagement described above were considered highly successful, there are grounds for adopting a more cautious view. The majority of experiments described above fall under the more modest category of online citizen involvement mechanisms (i.e., *online consultation* or *feedback*). As such, they risk reproducing the shortcomings of traditional citizen consultation. In addition, even those initiatives that succeeded in generating significant public awareness and participation, such as the Romanow Commission, had significant shortcomings. Space does not permit a detailed assessment of all the initiatives described above. Instead, the remainder of this chapter is devoted to an assessment of two—the Romanow Commission's online consultation and the online component of DFAIT's Foreign Policy Dialogue. Both were successful in many respects. And, yet, when examined more closely in light of the theory and practice of engagement, it becomes clear that the development of online citizen engagement is still in the initial stages.

### Romanow Commission on the Future of Health Care in Canada

The recent online consultation by the Romanow Commission on the Future of Health Care in Canada was a success in many ways, with over 36 million hits to the Commission's Web site and 16,000 online consultation workbooks submitted. The site also contained a variety of high quality resources, including Commission research reports, summaries of the Commission's fact-finding work, and links to third party resources and analysis. However, a number of aspects of the consultation also underscore the potential limitations of such exercises. First, after working through a series of readings, citizens who filled out the online workbook were invited to indicate their preference for one of four pre-selected "options" for future health care policy, raising the problem of issue-framing and agenda-setting. In addition, while the Commission Web site contained background information and statements regarding the pros and cons of the various options presented, there was no way to ensure that workbook responses were based on careful political judgment. Moreover, as the Commission's own demographic analysis later revealed, respondents were highly unrepresentative of the Canadian population as a whole. The typical respondent was an older, well-educated female employed in the health professions (Jackson, Zagon, Jenkins, & Peters, p.vii). While canvassing the views of stakeholders like these is worthwhile, neither the process nor the outcome should be mistaken for broad citizen engagement.

The qualitative disadvantages of online citizen consultation, in terms of promoting civic literacy and social cohesion, were evident as well. The online consultation workbook offered the Commission little more than a snapshot of responses to reading material and policy options digested by respondents over approximately a twenty-minute period (the average time taken by respondents to complete the Workbook). This was in contrast to the series of daylong, face-to-face deliberative dialogues also held by the Commission, which involved randomly selected participants from across the country. Participants in the day-long deliberative dialogues reported not only increased understanding of the issues, but a greater commitment to the process of negotiation and compromise, and increased levels of respect for and solidarity with their fellow dialogue participants (Maxwell et al, 2003).

### Foreign Policy Dialogue

The Foreign Policy Dialogue (FPD) was a policy consultation and discussion process initiated by DFAIT to gather public policy advice on Canada's role in the world. The Dialogue was groundbreaking in a number of respects, not least because few national governments invite citizens to take part in the shaping of foreign policy on or off-line (Graham, 2002). The FPD Website was organized around an official consultation paper produced by DFAIT. Unlike the Romanow Commission's, the Foreign Policy Dialogue's Web site included a space for citizens to engage with one another via an online discussion forum. One of the other innovative aspects of the FPD was that it operated as a partnership between DFAIT and byDesign eLab, a civil society organization. The civil society partner was responsible for the design and maintenance of the site, as well as for screening all posts to the site to make sure they adhered to a set of *civil speech* rules.

As noted above, the FPD site received 1.5 million hits and over 62,000 unique visitors. Like the Romanow Commission site, however, the FPD site, and especially the discussion forums, came to be dominated by a small group of heavy users who logged into the site many times a day, thus compromising the representativeness of the results. In addition, while the Dialogue Web site enjoyed strong ministerial support, government participation in the online discussions was slight. Because government officials did not actively engage with citizens during the course of the online consultation, participants were basically left with an advanced *consultation* model, where they provided government (and each other) with feedback, but in which they were not truly *engaged* by government. Post-dialogue analysis revealed other limitations, one of which is the difficulty of adequately reporting the results of a large

volume of citizen advice. After the Web site closed, the civil society partner analyzed the data and produced a report for DFAIT that included not only detailed site statistics but also a qualitative analysis of citizens' input. The lasting impact of the Dialogue process on Canadian foreign policy development remains unclear, however. The consultation focused on broad policy issues not conducive to specific policy responses, and this is reflected in the report.

On balance, the results of the Romanow Commission and DFAIT online consultations can be summed up as mixed. Both represented groundbreaking and innovative responses to citizens' demands for greater input into the policymaking process in Canada. Both offered Web sites that were relatively rich in content and offered interactive features like online workbooks and/or online discussion forums. Compared to most other online consultations conducted thus far, they received fairly heavy traffic as well. However, they shared a number of important limitations, including a lack of representativeness, a lack of opportunities for genuine online engagement between citizens and government representatives, and a lack of clarity on how results would influence policy. Failure to address these limitations in future online consultation and engagement exercises risks reproducing the shortcomings of previous models of consultation.

## FUTURE TRENDS

With the relative success of the online components of the Romanow and DFAIT consultations, the use of online consultation is becoming increasingly common at the federal level. Over half of all federal government staff have now used some form of online consultation in their work (Online Consultation Technologies Centre of Expertise, 2005). At the time of writing, the federal Consulting Canadians Web site listed 27 active public consultations in progress, many of which had a substantial online component. In addition, experiments and pilot projects are being conducted with more recent technologies such as wireless devices, Weblogs, podcasts, and RSS (Real Simple Syndication) news feeds in order to deliver government news and information in new, increasingly customizable formats. The recently announced Government of Canada Wireless Portal (http://canada.gc.ca/mobile/wireless_e.html), for example, allows citizens to use Web-enabled mobile devices such as cell phones and personal digital assistants (PDAs) to access government information and services, including news releases and backgrounders and Members' of Parliament contact information. Most of these experiments, however, fall under the rubric of online information provision and consultation, as opposed to the richer modalities of citizen engagement both on and offline that harbour greater potential to impact on civic participation broadly speaking.

The use of online consultation has also begun to spread to the provincial and municipal levels of government across Canada. The province of Ontario, for example, used online consultations in 2003 and 2004, along with more traditional face-to-face consultations, to solicit public opinion on the province's budget priorities in the face of consecutive deficits (http://www.townhallontario.gov.on.ca/), engaging over 14,000 Ontarians in the process (Borins, 2004). The City of Toronto has also incorporated online technologies into a number of recent public consultations, including its Listening to Toronto (2003-2004), City of Toronto Act (2005) and Governing Toronto (2005) consultations. As at the federal level, however, the long-term impact of such consultations on public policymaking and, ultimately, civic engagement, remains to be seen. In addition, in the event that such consultations do prove influential, governments will have to take greater care to ensure that the results of such exercises are truly representative of the full spectrum of citizen experiences, interests and opinions, including making efforts to enable all Canadians to participate in the emerging online public sphere.

## CONCLUSION

In response to the decline of civic engagement in Canada, enthusiasts of online consultation have argued that the adoption of new mechanisms of public involvement will reinvigorate citizen-government relations and revitalize the practice of democracy. Such hopes are understandable given the circumstances, but evidence that political participation and engagement can be restored using online technologies remains thin, and they run contrary to substantial academic research on the Internet and political participation, which is inconclusive at best. Out of this research comes a variety of concerns, including the impact of the digital divide in further marginalizing disadvantaged groups in the political process, and the balkanized nature of the online public sphere (Gidengil et al., 2004; Hague & Loader, 1999; Putnam, 2000; Sunstein, 2001; Wilhelm, 2004). Future research and practice will need to face these issues squarely to ensure that online consultation and engagement make truly useful contributions. Online consultation should continue to have a place in government tool-kits for involving and engaging citizens, but not at the expense of other innovative channels of communication, such as face-to-face deliberative dialogues, or efforts to reform democratic institutions such as electoral or parliamentary systems. A reform

strategy mixing and integrating the two will likely produce the best results.

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## KEY TERMS

**Citizen Consultation:** A process of involving citizens in policymaking by inviting them to respond or give feedback to government on a particular policy issue or proposal. Traditional consultation exercises such as public hearings and opinion surveys fit into this category, as do some electronic consultations that provide a feedback form or an e-mail address for citizens to send in their comments.

**Citizen Engagement:** A partnership between citizens and government in which citizens enjoy opportunities to dialogue both with government and one another on policy issues, and in which citizens actively engage in the policymaking process by proposing policy options and shaping the policy dialogue.

**Civil Speech:** A requirement for successful dialogue in the public sphere. Civil speech helps to ensure a productive and tolerant space for dialogue that is aimed at finding common interests and goals. Civil speech goes beyond good manners or etiquette to encompass an orientation towards understanding, and an attitude of respect for the opinions and experiences of all participants in a discussion.

**Deliberative Dialogue:** A policy decision-making technique in which citizens interact with both policy experts and one another to consider multiple perspectives on a given policy issue. The approach involves extended dialogue, critical thinking, and learning from both experts and fellow citizens.

**Online Feedback:** A process by which the government creates opportunities for citizens to provide feedback and input on a particular issue, using the Internet. Examples of online feedback include using Web-based forms, responding to questions in an online poll, or submitting qualitative responses to a policy document via e-mail.

**Online Discussion:** A process by which the government provides opportunities for citizens to interact with government and one another in a discussion, debate or meeting online. Unlike online feedback processes, online discussion-based consultations provide opportunities for the public to join a conversation, share ideas, collaborate on projects and build relationships through electronic communication.

# Online Dispute Resolution

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## INTRODUCTION

Every community—whether physical or virtual—will inevitably experience conflict. New ways of interacting through information and communication technology has led to new conflicts, such as domain name or e-commerce disputes. At the same time, governments need to deal with the entire range of disputes in society, whether crimes, neighborhood disputes, ethnic conflict, or disputes with its own employees. A key role for government and for e-governance is providing mechanisms to help resolve these disputes.

The emerging area of online dispute resolution (ODR) potentially offers a useful set of tools and techniques for resolving disputes. Capable of being used for both online and off-line disputes, ODR has already proved that it can provide effective resolution for at least some disputes: more than 1.5 million cases had been successfully resolved online to July 2004 (Conley Tyler, 2005).

Governments and e-governance institutions around the world are adopting or considering the applicability of ODR as a tool for digital government.

## BACKGROUND

ODR refers to dispute resolution processes conducted with the assistance of information technology, particularly the Internet.

ODR has been available since 1996 and has rapidly passed through three broad stages of development:

- A "hobbyist" phase where individual enthusiasts started work on ODR, often without formal backing
- An "experimental" phase where foundations and international bodies funded academics and nonprofit organizations to run pilot programs
- An "entrepreneurial" phase where a number of forprofit organizations launched private ODR sites (Katsh & Rifkin, 2001, pp. 47-72).

ODR is now entering a fourth "institutional" phase where it is piloted and adopted by a range of official bodies including courts and government dispute resolution agencies (Conley Tyler, 2003).

Two main forces have been driving the development of ODR to date (Conley Tyler & Bretherton, 2003). First, the difficulty of utilizing traditional dispute resolution methods in low-value cross-border disputes has led to interest in low-cost, cross-jurisdictional dispute resolution methods. This has been a particular concern for governments and intergovernmental organizations interested in fostering e-commerce (Federal Trade Commission, 2000; OECD, 1999; Trans Atlantic Consumer Dialogue, 2000). Without effective remedies in the "borderless marketplace," where traditional court-based remedies are not a realistic option, consumers and business may decide not to transact (Consumers International, 2001). Consumer confidence is seen as a key issue in increasing the level of online commerce.

At the same time, the forces that promoted alternative dispute resolution (ADR) as an alternative to court adjudication in recent decades are also driving the development of ODR. Some ADR enthusiasts have been motivated to investigate the potential of the online medium to provide more effective techniques for dispute resolution—in some cases, from simple curiosity (Raines, 2006). The search for more convenient, cost-effective, efficient, and durable ways of resolving disputes will continue for as long as disputes exist (Brannigan, 2004).

## CURRENT STATE OF ODR

### Types of ODR

ODR has adapted traditional dispute resolution processes for use online, including facilitated negotiation, mediation, arbitration, and case appraisal. Courts now provide some of their functions online in some jurisdictions. *Facilitated negotiation* is the simplest form of ODR in which an online space is provided where parties can negotiate directly. This can include *collaborative peacebuilding tools* that facilitate multiparty discussions (Balvin, 2005; Hattotuwa, 2005). *Online mediation* involves a trained neutral who facilitates the negotiation process either via a secure Web site or e-mail (Raines, 2006). In *online arbitration* or *adjudication,* a skilled neutral (either a private arbitrator or a judge) will adjudicate on one or more issues, receiving evidence either via

electronic documents or videoconferencing. *Case appraisal* is where a neutral party considers a dispute and provides nonbinding advice. This can include, as for iCourthouse (www.i-courthouse.com), through a virtual "jury" mock trial.

In addition, a number of new ODR techniques have been developed to take advantage of new information and communications technology. These do not have precise analogs in the "real world." *Automated negotiation* allows communication between disputants without a human intermediary. It includes processes such as "blind bidding" where parties submit confidential settlement offers during a number of rounds. A computer program automatically notifies them of a settlement at the arithmetic mean once the offer amounts are sufficiently close (see Cybersettle, www.cybersettle.com, for an example). *Negotiation support systems* have also been designed to take advantage of the online medium (Belluci & Zeleznikow, 2005; Kersten, 2005; Lodder & Thiessen, 2003). They are expert systems that allow manipulation of negotiation variables by one or both parties to help them plan and conduct negotiations.

## Communication Methods

The communication tools used in ODR have changed as online technology has developed (Kaufmann-Kohler & Schultz, 2004). Early ODR sites tended to rely mainly on e-mail meaning that communication was delayed, text based, and insecure. By contrast, most services launched since 2001 use a secure Web site encrypted by Secure Socket Layers (SSL) technology where parties are given a password to access a Web site area dedicated to their dispute.

Sites can either allow asynchronous communication through threaded discussion (bulletin boards) or real-time chat facilities. Instant messaging is being used by some sites, as is "secure e-mail" via an encryption program. Caucusing (the ability for one party to meet among themselves or with the neutral without the other party) is a basic feature in newer systems. Some sites offer facilities such as case tracking and document editing.

A number of providers integrate ODR methods with traditional tools such as phone, fax, teleconference, and face-to-face meetings. Videoconferencing is offered by a number of sites (Conley Tyler, 2005). The majority of sites provide a single-language service; however, there is an increasing number of bilingual and multilingual services.

## Types of Disputes

The range of disputes resolved by ODR has been broad: from family law to Internet domain name disputes; from small claims to insurance disputes. Online and off-line consumer disputes have been a major focus of ODR sites.

It is not surprising that many ODR sites were established mainly to resolve online disputes; however, a number of sites have focused mainly or exclusively on off-line disputes (Conley Tyler, 2005).

The areas of dispute handled fall into five broad categories:

1. **Consumer Disputes:** For example, ECODIR (www.ecodir.org), the European Union's prototype online consumer dispute resolution site or Square Trade (www.squaretrade.com), a U.S. service that offers facilitated negotiation and mediation of mainly online disputes, including eBay auction disputes.
2. **Internet Disputes** (especially domain names)**:** For example, the Asian Domain Name Dispute Resolution Centre (www.adndrc.org), based in Hong Kong, which arbitrates Internet domain name disputes.
3. **Commercial, Family, Workplace, and Neighborhood Disputes:** This includes providers such as The Claim Room (www.theclaimroom.com), a UK company that provides mediation for mainly commercial litigation disputes and SmartSettle (www.smartsettle.com), a Canadian company that helps people prepare for negotiation by analyzing their preferences and the options on the negotiation table. Others deal with quintessentially "real world" disputes within workplaces and families: the Federal Mediation and Conciliation Service (www.fmcs.gov) is a U.S. government service that brings laptops to the workplace to conciliate labor/management disputes while Family Mediation Canada (www.fmc.ca) provides Web-broadcast teleconferencing and joint document collaboration for parties in family disputes.
4. **Complex Litigation:** A number of courts now provide online facilities including the Federal Court of Australia's eCourt (www.fedcourt.gov.au) which enables electronic filing and document management and offers a "virtual courtroom," particularly for Native Title hearings in remote areas. Singapore's e@dr (www.e-adr.gov.sg) is another example.
5. **Peace and Conflict:** Info-Share (www.info-share.org) provides tools for bringing the parties in the Sri Lankan peace process together electronically while the Cultures of Peace News Network (www.cpnn.org) is a global network of sites created by United Nations Educational, Scientific, and Cultural Organization (UNESCO) to enable people to share information on promoting peace.

What is striking is the number and variety of situations where people are choosing to resolve their disputes online.

## Uptake of ODR

As of July 2004, at least 115 ODR sites and services had been launched with examples in each continent including South Africa, Peru, and the Philippines (Conley Tyler, 2005). Most ODR sites were located in North America or Europe; however, there has been notable growth in the Asia Pacific (Hattotuwa & Conley Tyler, 2006). While most ODR systems rely on fixed technologies such as personal computers, some ODR systems have started to use mobile technologies such as short messaging service (Hattotuwa & Conley Tyler, 2006). This may help to overcome the "digital divide" (Parlade, 2003; Wahab, 2005) and make ODR more attractive in the developing world (Hattotuwa, 2006).

The number of cases dealt with by ODR sites varies widely: from only one case to more than one million disputes (Conley Tyler, 2005). Lack of information for all sites makes it difficult to make comprehensive judgments (Consumers International, 2001). While some sites that do not caseload information may have attracted fewer cases (Schultz, Kaufmann-Kohler, Langer, & Bonnet, 2001), other factors such as client confidentiality may prevent some providers from reporting on their results.

Settlement rates fall between 50% and 95% and are broadly comparable with settlement rates for ADR generally (Conley Tyler & Bretherton, 2003). There is no evidence that online settlements are less durable than other ADR outcomes. Enforcement of ODR outcomes may be problematic in some circumstances (Kaufman-Kohler & Schultz, 2004, pp. 209–233).

Most ODR sites have formal policies and procedures, including dispute management protocols, standards of conduct, codes of practice, and privacy policies (Conley Tyler & Bornstein, 2005; Wiener, 2001).

## Advantages and Disadvantages of ODR

ODR has a number of advantages over traditional dispute resolution methods:

- Bridging distance, saving travel and venue costs
- Enabling parties to access expertise outside their local area
- Improved transfer, retrieval, and storage of data
- Enabling delayed communication 24 hours per day
- Improving access to justice for some groups (e.g., those who are isolated, disabled, under threat of physical violence, or shy in face-to-face settings)

However, ODR also has potential disadvantages:

- Text-based methods reduce communication cues which can lead to misinterpretations, negative interpersonal behavior, and frustration due to delays in response
- Online communication advantages those who are familiar and comfortable with the relevant technology and tools. (By contrast, face-to-face dispute resolution advantages people who are physically attractive, articulate, well-educated, or members of a dominant ethnic or racial group.)

The list of advantages of ODR helps explain why ODR tools are being used by an increasing number of people to resolve their disputes. ODR can be a convenient, quick, and low-cost option. For some disputes, such as low-value, cross-border Internet transactions, ODR may be the only financially feasible settlement option. In other cases, the choice can be because of costs, time, or inclination. Sometimes people in dispute simply prefer not to meet. Technology can be particularly useful where parties would be in physical danger if they were to meet (Hattotuwa, 2005).

Because it disadvantages some disputants, ODR is not a substitute for other methods: it should be seen as an additional tool for dispute resolution (Conley Tyler, Bretherton, & Bastian, 2003).

As ODR practice develops, guidance will be required on the appropriate situations for its use. Some disputes are not suitable for any type of ADR. Other disputes are eminently suitable for ODR, such as online disputes and single transaction disputes. At this stage there are no agreed guidelines about the type of disputes that can be resolved through ODR: the key limitations are the needs of the parties and the ADR practitioner. More guidance on these issues will become available as ODR practitioners begin to reflect on their skills and techniques (Raines, 2006).

# LESSONS FOR GOVERNMENT

The current state of ODR thus shows an impressive and growing body of experience and best practice, including through government-provided ODR. The future is likely to bring increased adoption of ODR by governments and other formal institutions.

A case study of the Department of Justice Victoria illustrates the government rationale for ODR and demonstrates a high level of interest in ODR among the general public and government dispute resolution agencies. This is likely to have parallels in government contexts in other jurisdictions.

## Government Rationale for ODR

The Government of Victoria, Australia's second most populous state, is committed to bringing the benefits of

information technology to all its citizens. Investigation of ODR was a logical consequence of its previous information technology policies.

In 1999, the Victorian Government issued *Connecting Victoria*, a blueprint for growing the State's information and communications technology to ensure that all citizens would benefit from technology. One of the key commitments in this policy was to have all suitable government services available online by 2001: a goal which was achieved. Victorians now have access to over 450 government services through www.vic.gov.au and the evidence suggests that online government services have been well received: a survey of online users found that 82% of respondents said electronic service delivery made government services more accessible and 62% thought it improved service quality (summarized in Conley Tyler, Bretherton, & Bastian, 2003).

As well as improving its service delivery, the Victorian Government believes its adoption of "leading-edge" technology will have two other effects:

- It will help make government itself more open, efficient, and accessible.
- It will encourage business and citizens to adopt e-commerce and the Internet.

In line with these aims and its *Growing Victoria Together Strategy*, the Victorian Government committed funds to the Department of Justice to investigate ODR. It was seen that ODR could contribute to the priority action area of promoting rights and respecting diversity, including:

- improved access to courts, legal aid, victim support, and ADR.
- improved awareness of rights and the promotion of equal opportunity.
- improved access to services for culturally and linguistically diverse Victorians.

## Assessing Government and Citizen Demand for ODR

In 2002, the Department of Justice Victoria commissioned the International Conflict Resolution Centre at the University of Melbourne to undertake research evaluating current ODR practice, assessing likely demand for ODR, and recommending whether the government should proceed with ODR. The needs assessment was conducted through online and hard-copy surveys, focus groups, and public and stakeholder consultation (Conley Tyler, Bretherton, & Bastian, 2003) and may be the first time a government has conducted a detailed study of public demand for ODR.

Survey and focus group participants represented a broad cross-section of the community, including people who had never used computers, rural and regional participants, people from a non-English speaking background, people from a range of age groups, and a person with hearing impairment. Government agencies consulted included a court, an administrative tribunal, a consumer complaints agency, an industry regulator, and a neighborhood mediation service. These provided a range of dispute resolution services including complaint handling, mediation, investigation, and adjudication. The main communication methods currently used by these agencies were telephone, mail, and face-to-face contact, with only one agency conducting a large part of its communication online.

## Results

Surveys, focus groups, and expert consultation revealed overwhelming public interest in ODR services (Conley Tyler, Bretherton, & Bastian, 2003).

More than 70% of respondents reported that they would be willing to consider ODR both for general disputes and for disputes with an online company. Daily and weekly computer users and people who use banking and auction sites were more likely to consider ODR. The major factors influencing choice of process were cost, speed, and convenience. Dissatisfaction with existing methods of dispute resolution was a factor in motivating participants to consider online options. A number of participants were fairly fatalistic about disputes and might currently end up seeking no redress because of dissatisfaction with existing methods. This suggests that ODR may have a role in promoting access to justice.

However both focus groups and surveys revealed a smaller but significant group of people who are uncomfortable with online communication and are unlikely to use ODR in any circumstance. Given this, ODR should be considered as an addition rather than as a substitute for any current dispute resolution service.

Consultation also revealed considerable interest in ODR from government institutions. Five of the agencies consulted saw a fit between their current strategies and some form of ODR. Agencies consulted identified a number of important advantages to ODR, including the ability to bridge distance, to improve transfer and storage of data, to improve access to justice for some groups, and offer a number of efficiency benefits. Some concerns were also identified, including reduced communication cues, user impatience, privacy, security, accessibility, and equity.

The majority of agencies consulted saw the benefits of ODR and were interested in introducing some ODR techniques as an additional service. ODR was not viewed

as a substitute for existing services or as suitable for every case. One of the major drivers was the belief that ODR was inevitable given changing community expectations of service delivery.

The process undertaken by the Department of Justice can serve as a model for other governments and institutions in considering whether to introduce ODR.

## FUTURE TRENDS

The demonstrated high level of interest in ODR among both government agencies and the general public suggests that the future is likely to bring increased adoption of ODR by governments and other governance institutions in order to deal with the inevitable conflicts that occur in any community.

An important lesson from the experience of ODR to date is not to underestimate the speed at which online technology develops (Rule, 2003). Sites created as recently as 2000 can now appear out of date while the technology of 1997 is obsolete. The future may see the imaginative use of images, graphics, shapes, and symbols and greater use of video and audio streams and video conferencing. This will have implications for dispute resolution practitioners' skills (Conley Tyler & Bornstein, 2006; Conley Tyler & Raines, 2006; Syme, 2006) and the adoption of technology by government and e-governance institutions.

## CONCLUSION

ODR has developed rapidly and is now offered by more than 115 dispute resolution agencies around the world, including government providers. ODR encompasses a diverse range of dispute resolution processes using a range of communication tools and is potentially applicable to most disputes. It should now be considered as a standard tool for government and governance online.

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## NOTE

A full bibliography of research in ODR is available at Conley Tyler, M., & Allen, E. (2005). *Online dispute resolution library index*, launched 4 April 2005. Retrieved December 9, 2005, from www.odr.info. Thanks to Rose Balian for her assistance in preparing this entry.

## KEY TERMS

**ADR:** Refers to processes other than judicial determination in which an impartial person assists those in a dispute to resolve the issues between them (NADRAC, 1997). Processes can be divided into determinative, advisory and facilitative types.

**Arbitration:** The main determinative process in which the parties to a dispute present arguments and evidence to a neutral third party who makes a determination that is binding on parties.

**Case Appraisal** and **Mock Trial:** These are advisory ADR processes. In each process, an ADR practitioner considers and appraises the dispute and provides non-binding advice as to the facts, law, and possible outcomes.

**Conciliation, Mediation,** and **Facilitated Negotiation:** These are facilitative processes. In each case the parties to a dispute, with the assistance of a neutral third party, identify the issues in dispute, develop options, consider alternatives, and endeavor to reach an agreement.

**ODR:** Term used in this paper for ADR processes conducted with the assistance of information technology, particularly the Internet. Other terms used are "Online ADR," "eADR," "iADR," "virtual ADR," and "cyber mediation/arbitration." Simply providing information about ADR on a Web site is not online ADR.

**Online:** A colloquial term that refers to communication through an electronic medium, especially the Internet. Online communication includes:

- **E-Mail:** A virtually instantaneous transfer of text messages.
- **Instant Messaging:** A variant of e-mail that can be used asynchronously and also allows synchronous online chat.
- **Online Chat:** A synchronous, text-based exchange of information.
- **Threaded Discussion** (also known as bulletin boards)**:** An asynchronous, textual exchange of information organized into specific topics.
- **Videoconferencing:** Aynchronous transfer of video information

**Off-Line Disputes:** Any disputes that arise in the "real world" outside of cyberspace. These include family, neighborhood, and employment disputes.

**Online Disputes:** Any disputes that arise through or because of online communication methods, including disputes within online communities.

# Online Learning for Public Institutions



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## INTRODUCTION

Three factors have accelerated the need for continuous learning for public administration employees: (1) improvements in information technologies that provide greater opportunities to gather, store, and transmit knowledge; (2) the increase in jobs required to produce and to manipulate knowledge; for example, the Canadian federal government estimates that 75% of its employees are knowledge workers; and (3) employee mobility is increasing, as shown by a yearly turnover of 40% of the U.S. workforce, or approximately 50 million employees.

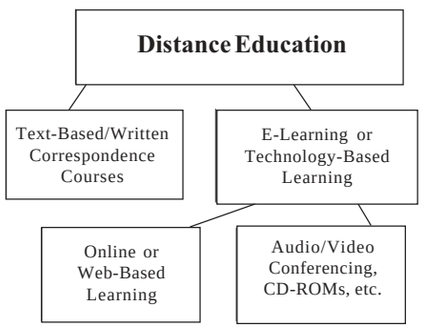
Therefore, continuous learning is becoming an important issue for employers and employees. In a survey of the 50 U.S. state governors on higher education issues, the most important issue was encouraging lifelong learning (Klor de Alva, 2000), leading to a need for learning management, where an organization controls internal and external knowledge as an important performance factor for both individuals and the organization.

In the past, continuous organization learning in the public sector was associated with dedicated central learning centers. For example, the Canadian federal government's education center for middle- and senior-level public servants, the Canada School for Public Service, had two large centers with classrooms and libraries, one with residential capacity.

Most of the new knowledge obtained by public servants required large expenditures of capital and time in order to move employees and instructors away from their places of work to learn together in classrooms. Not only is this model expensive, but it also places a significant gap between learning a concept and being able to apply that concept to daily work. Online gives the learning manager a new tool that might be more cost effective (Langford & Seaborne, 2003).

With the development of new information technologies, many leaders are questioning the place-bound synchronous classroom model as the best model for developing educational experiences. For example, U.S. governors' next three important higher education issues after lifelong learning were (1) providing opportunities to obtain education anytime and anyplace via technology, (2) requiring postsecondary institutions to collaborate with business and industry in curriculum and program development, and (3) integrating on-the-job experience into academic programs (Klor de Alva, 2000). The new instructional model that is emerging delivers smaller units directly to the employee and very close to their work site or home; it is often called online education.

*Figure 1. (Wild, 2003)*




## WHAT IS ONLINE EDUCATION?

As shown in the following diagram, e-learning is a subset of the more comprehensive term *distance education*. Text-based written educational experiences that have been delivered for many decades (often called correspondence schools) are the other part of distance education. E-learning can be divided further into the delivery of education via electronic media such as CDROMs, audiotapes, and so forth, and online learning with instruction based on the Web. The military uses the interesting descriptive term *advanced distributed learning* for online education, which paints a wonderful image of how information technologies work (i.e., streaming the learning experience throughout the world).

## BACKGROUND

In 2001, Pearson, the large British media group that owned 50% of *The Economist*, believed that there was "a potentially vast market for electronically delivered teaching

material." The U.S. alone spent $800 billion on education in 2000, and in that same year, 40% of all U.S. college classes were using Internet resources (Scardino, 2001). In February 2004, Global Network Academy reported 35,766 online courses in 8,052 programs.

IBM and Microsoft have workplace online programs in order for their employees to obtain advanced degrees and credits. The companies cover the cost of the courses, and the workers take the courses at home on weekends. IBM employees obtain their degrees from the University of Texas at Austin, while Microsoft employees enroll at the Oregon Health and Science University's School of Science and Engineering (*Information Week*, 2002).

Warwick University in Britain and Acadia University in Nova Scotia require all students to use laptops for their studies, and students at public colleges in Massachusetts must own a laptop computer in order to enhance their online learning. Spearheaded by the University of Dundee in Scotland, more than 50 schools in 16 countries are working together to develop an online medical school called the International Virtual Medical School. One of the objectives is to counter the pattern of medical students going abroad for their education and not returning to their country. The degrees are to be granted by individual universities, all of which are accredited. The plan is to have students in a clinical setting about 30% during the first two years of the program and 70% in the following years (Mangan, 2002).

The University of Phoenix Online and the University of Athabasca have been two of the most successful online universities. The former has grown over the last few years from 19,000 to more than 65,000 students. This university does not have a physical campus and is not developed for the employees to meet any faculty or students on campus (A. Siegrist, personal communication, 2003). The admissions criteria for an undergraduate degree are a high school diploma and access to a work environment that allows application of the learning concepts. University of Phoenix Online trades on the New York Stock exchange as the Apollo Group. In September 2000, the initial offering was $14 and traded for more than $77 in February 2005.

The University of Athabasca has more than 30,000 students, doubling its enrollment from 1999 to 2005. The programs are based on an open university model that does not require any level of prior academic achievement. They have gained the respect of Canadian traditional universities by allowing students to transfer Athabasca credits into traditional universities. However, it is not hard to final examples of failures. Many online programs founded during the Internet boom did little but hemorrhage money. Pensare, an online MBA company using Duke courses, and Quisic, an online program developed with the Tuck School of Business at Dartmouth, were scrapped. SUNY Buffalo had an online MBA program that lasted only 18 months.

In mid-September1997, the California Virtual University (CVU) enthusiastically opened its doors, promising a Web site that would feature the online and distance education offerings of all California accredited colleges and universities. By April 1999, all that remained was a listing of online courses and programs offered by other California institutions. CVU's plans for a virtual library and online guidance counseling service were abandoned.

The University system of Georgia started a pilot program in 1997 with 8,000 laptops, requiring students at Clayton College & State University and Floyd College to lease laptops for $300 per semester. Students and faculty praised the program. But the state university system went $1.5 million in debt from the three-year experiment, and Georgia decided to end mandatory student laptop leasing programs. Students now are required to purchase laptops (Chronicle of Higher Education Online, 2001).

Many people believe that online learning cannot be as effective as traditional classroom learning with certain subject matters. The argument, even from technology knowledgeable people, is that the humanities are ideal for operating via electronic text, but areas that require any degree of physical dexterity and direct observation, such as general medicine and specialities like brain surgery, do not seem compatible for online teaching (Levinson, 1997). However, there is no empirical evidence to support this view, and it ignores the growing trend of medical personnel remotely interacting with patients through scopes and sophisticated testing.

There is a gender difference for online learners. According to a study of the American Association of University Women, women find greater levels of difficulty taking online classes than men do. Interviews were conducted with 500 students, predominately female, of which almost 33% were pursuing degrees, not just a few courses for enrichment or career advancement. The study concluded that women essentially were adding a third shift, of coursework to their regular jobs and homemaking/childcare duties. In addition, the cost of online classes was adding stress, because the funds required for tuition, online subscriptions, and equipment were equivalent to traditional classes (Chronicle of Higher Education Online, 2001).

## FORMAL INSTITUTIONAL ONLINE LEARNING

The remainder of this article analyzes formal institutional online learning. Like many aspects of the virtual world, writers spend a lot of time looking at the *e* (electronic) part of an e-concept and less time on the other aspects of the concept; in this case, the *l* (learning) part. Both parts are

important to analyze, but with online learning, the *learning* part should take precedence. If you have a firm grasp on how to help students to learn, the software and hardware to best complete the job should be easy to determine. For example, the two major heavyweights on the software side are WebCT and Blackboard. The ease with which they work on computer platforms is important, but even more important is the learning principles on which they are based. This article presents criteria with which to analyze online learning programs.

What is known about the quality of online classes delivered by institutions? So far, very little, first, because these programs are only a few years old; and second, because technology is improving so rapidly that each month brings new possibilities for exchanging information.

There are understandable reasons why the perfect methodology has not been developed for learning. The first is that learners and instructors come into the classroom as very complicated and changing organisms. How they connect with the material being examined is related to countless variables, the most important of which are their intelligence, prior knowledge, and life experiences, each so complicated that it cannot be analyzed in full and related to the material being taught. The learning experience is related even to daily life experiences, such as the commute to class, what happened at home before class, and the amount of sleep obtained the night before. Therefore, the teacher always is faced with learners with different needs and motivations, and a one-size-fits-all concept will never apply. Although these variables make it impossible to design a perfect program for everyone, online learning may be a very significant breakthrough for instruction and learning, because it allows for much more individualization than has been possible before.

## Online Learning Studies

There have been some helpful studies about online learning and a body of knowledge is being developed; for example, a comparative study of interaction of more than 100 students from the MBA programs at Athabasca University and the University of Western Ontario's Richard Ivey School of Business (classroom-based). Athabasca's course methodology is very basic, including printed materials mailed to students and online and asynchronous text discussions. Western Ontario's courses use a typical classroom-based synchronous methodology. Of the four types of interactions examined—social, procedural, explanatory, and cognitive—the Athabasca students reported that they had better explanatory and cognitive interactions. The Ivey students reported higher social and procedural interactions (University Affairs, 2001). Neither methodology was clearly superior over the other.

Another study undertaken as part of a college of business preparation for its reaccreditation review compared programs by learning outcomes (Kretovics & McCambridge, 2002). The MBA program, available in three forms of delivery, had similar course syllabi and instructors in two of the three-learning contexts. The three delivery types were a traditional on-campus classroom synchronous program, a similar executive program, and a distance education program offered online through a learning software program supplemented by videorecordings of each on-campus class session.

All the students were measured, first on their self-reported performance on learning outcomes assessment instrument from the beginning of their MBA program to the end and, second, on learning outcomes assessment. The results indicated that face-to-face interaction between the student and the instructor may not be essential to the instructional process. A well-developed virtual community can meet student needs as well as in-class time. The findings lead to the conclusion that distance students actually may learn more than traditional classroom-based students (Kretovics & McCambridge, 2002).

In a study on effectiveness of an online introductory psychology course at the University of Massachusetts, the majority of students gave high course evaluation ratings, but the online students reported being more satisfied with the instructor and the amount of interaction and feedback (Poirier & Feldman, 2004).

It is increasingly clear that the learning applications that will dominate the Web will take full advantage of nonlinearity and its potential for instantaneous feedback and learner interaction. The richness of the medium at high bandwidth presents a learning environment in which the learner becomes immersed. It is possible to have mass customization, which draws the learner into a process that will motivate him or her to be totally involved. Students can work their way through learning materials in a way that best fits their individual learning styles. The route and the pace can be adapted for each learner. This new learning environment will bear no resemblance to today's faculty lecture notes or textbooks (Heterick & Twigg, 2001).

Many college administrators say that the quality of their institution's online courses soon may eclipse their brick-and-mortar offerings, according to a report by Babson College and the Sloan Consortium. The study concluded that about one-third of college administrators believes that within three years, the quality of their institution's online programs will be better than the on-campus offerings. Almost 60% said that their present online courses were at least equivalent to the quality of their on-campus classes. The same survey found that 11% of postsecondary students took at least one course

online in the fall of 2002, with more than one-third of those students taking all their courses online. Students taking online classes are on the increase, because public colleges are producing more online offerings. On the other hand, one-third of college officials, mostly from private baccalaureate institutions, predicted that online courses will not play a major role in their programs (Chronicle of Higher Education, 2003).

## Ingredients for Quality Online Education

The most important point of any course is the extent to which it provides a good learning experience for the student. Good learning experiences never can be guaranteed, but following are five ingredients that will increase the likelihood of an outstanding experience.

### Instructor and Course Developer

In an online course, a student will have less direct contact with an instructor than in a traditional class and will rely more heavily on a learning path described in the course materials. Therefore, the content and the design of the class methodology are very important. The institution delivering the program should clarify the qualifications of both the course developer and the instructor. If a student cannot find this information, he or she should be concerned.

At least one of the most popular online universities, the University of Phoenix, has a policy that online faculty members must work full time in an area related to their courses. I am suspicious of this policy and question how these people have the experience and depth of knowledge to design and deliver a quality course and program. It reminds me of the surgeon at a cocktail party who said to a renown author that when he retires, he wants to write. The writer, sensing a lack of respect for her expertise, quickly replied that she wants to become a surgeon when she retires.

The instructor should know the most relevant content to include in the course and how to apply it. This is not an easy task, because it requires both a depth of knowledge in relevant academic research and experience teaching students in the field.

### Content and Course Requirements

A student should expect the same quality of work required in a traditional campus-based class and more assignments than the traditional course. Why more assignments? Traditional classroom seminars require students to read material before the class in preparation for intelligent weekly three-hour classroom interactions. An online course should require something to replace this lost learning opportunity. One way to do this is to require additional writing, online chats, and/or testing.

### Reputation of the Institution

Every institution must build a reputation for quality work. It is possible for a new institution to deliver excellent programs and still to be an unknown quantity. However, all things being equal, when choosing a program, a student should pick a prestigious university. This will enhance a student's degree and possibilities for advancement.

### Cost

Cost is related only indirectly to quality, but it is an important factor, nonetheless. Online classes tend to be expensive in relation to campus-based classes. Dalhousie's MPA on-campus course fee is $595, while the MPAM online course fee is $1,700. Without the normal expenses for classrooms and libraries, it does not seem logical that online course tuition is substantially more expensive.

The cost is high now, because most programs are in the development stage with few students. The economics of scale apply to university courses in the same way that they apply to producing DVD players. At the same time, don't forget the cost and effort expended in traveling to a traditional class setting. Most graduate courses will have at least 13 classes that require 13 trips to the campus with 36 hours in the classrooms.

### Instructional Methods

How is online learning suited to different instructional methods? The U.S. National Training Institute of Applied Behavioral Science completed research on the average retention rate of material learned through seven different modes of instruction. The results reflect the percentage of students retaining material six weeks after a teaching experience (NTL Client Relations Center, 2003). From these results, the study ranked modes of instruction from least to most effective as follows: lecturing, audiovisual aids, demonstrations, discussion groups, practice-by-doing, teaching others, and immediate use. The origin and validity of this research is rather vague, but it appeals to me because it meshes with a general intuitive feeling about effective learning and is constantly reinforced by student evaluations of my courses. These modes of instruction are discussed next and related to online education.

## Lecturing

Lecturing has been the main mode of instruction in professional development and traditional university classroom settings. However, it may have the shortest retention rate among the different modes of instruction. In the past, slow Internet transfer made the delivery of lectures via streaming video impractical and actually may have made online instruction better than traditional classroom instruction. Instructors simply could not place their lectures online. Online instruction had to rely on other, more effective modes of instruction.

Increasing bandwidths and faster computers can deliver streaming audio and video online. But don't be impressed if an online site claims to emphasize lectures via streamed video, because their use must be evaluated in light of a potentially poor retention rate. Online education could take a step backward, if lectures become a major portion of online instruction.

## Reading

Reading text on the screen was the first use of the Internet for learning. Two of the most financially successful online programs—Athabasca University and University of Phoenix Online—have relied heavily on text-only instruction. Even with their success, a low retention rate for only text reading should introduce caution about programs that are based too heavily on text. On the positive side, online education through text has two major advantages over the print material used in traditional classrooms. The first is the opportunity to include hypertext markup language (HTML) for linking to different sources around the world and to learners worldwide. The second is the opportunity to have the material available for students anywhere in the world.

The major disadvantage is that most students still find reading online difficult, particularly if the software does not provide for making notes and for highlighting.

## Audiovisual Aids

The use of audiovisual aids improves the retention of material. PowerPoint presentations, pictures, video, and audio should be used to enhance key points of the lessons. These modes are more feasible online now than just a few years ago. The same audiovisual materials available in a classroom can be provided online with the advantage of access when the student is ready, as often as required, and anywhere there is an Internet connection.

## Demonstrations

Demonstrations push retention rates of learners even higher. Online learning allows the instructor through video to choose the exact environment needed to obtain optimum results. In addition, the learner can replay the demonstration as many times as required in order to understand the concepts. This is a distinct advantage over the classroom setting, where repeating a demonstration is usually not feasible and almost never in control of the student.

## Discussion Groups

Does an online program have discussion groups? The opportunity to discuss material in groups provides an additional increase in retention rates. Online text-only discussion groups lose some of the sensory characteristics of communication but actually have some advantages over in-class discussion groups by changing the playing field. Visual and auditory cues often give certain people advantages or disadvantages based on prejudices and irrelevant characteristics (e.g., size, accent) that distort communication. The text-only chat takes these irrelevant cues away and makes a student concentrate on the substance of the message. In traditional classroom discussions, the gregarious person usually dominates the shy introvert, often giving an advantage to males. With online chats, the student with good keyboard skills (often a female) has the advantage. In addition, online discussions can be placed on a Web site as a record for both students and professors and available for students that could not participate in the original discussion. This is never possible in typical classroom environments.

## Practice by Doing

Instruction should reinforce content with practice by doing through questions and exercises that increase retention rate. Requiring students to complete questions directly related to the material accomplishes practice, the simplest being short multiple-choice or precise short-answer questions. A more difficult form requires students to complete essay questions based on the material taught, and the most challenging mode uses essay questions based on material taught in case studies.

## Teaching Others

The instructional methods of teaching others and immediately putting knowledge into use are the most potent

learning techniques. Their commonality is moving the bulk of the process over to the learner.

If you have been required to teach a classroom of students, you understand the significant amount of work required for preparation. Therefore, it should be no surprise that it is one of the most effective learning experiences. The instructor (in this case, the student) must understand completely the material to be taught in order to answer questions and to provide additional explanations. Online students can teach by developing PowerPoint presentations with voice overlays in order to provide content and questions to other students. The material then is placed on the class Web site.

### Immediate Use

Immediate use involves acquiring knowledge and quickly applying that knowledge to a problem, which provides a very effective learning technique. This learning technique is well suited to online education. Since online learning can occur at a computer terminal at or near the workplace, the instructor can design questions and exercises that the student can apply immediately to the workplace.

## FUTURE TRENDS

What are the future trends of online education, especially in public organizations? As learners cross the often difficult barrier between what they know (classrooms) to the new and unknown online learning, they will understand that the online learning experience overall can be better. Therefore, there will be a swing, slowly but steadily, to online education. Public recognition cannot be gained overnight, and it will require many years of public servants receiving online quality learning as assessed by the learner and employer.

A second trend will be a differentiation between course developer and teacher. Online classes are based on meticulous and carefully prepared written and audiovisual materials and less on a theatrical performance from the professor, so it is easier for an instructor other than the course author to teach the class, potentially to thousands of students. Course developers will be compensated more than course teachers.

These online courses will generate hundreds of thousands of dollars in tuition fees, so who should benefit from these revenues? These issues, debated before over the use of textbooks, produced the well-accepted practice of royalties to the author from each copy sold. This could be the model used with online classes.

Software and hardware will continue to provide different and better opportunities for learning, so the possibilities for instruction already discussed in this article will continue to change and improve. For example, how will handhelds and wireless change the options for instruction?

Information technology has changed expectations for all aspects of learning, including the administration of the courses and programs. In the future, students will expect online access to course descriptions, program descriptions, applications, acceptance and rejection letters, tuition payments, and library facilities.

## CONCLUSION

This article emphasizes that learning still must be the driving force of any online instruction. Public institutions around the world still must provide learning environments for their employees and must see online learning as an effective alternative to the traditional classroom setting. Online learning is developing so rapidly that it is difficult to predict the future, except to say that there is a good chance that it will eventually dominate the delivery of courses.

Using the Pyramid of Learning, an analysis of the types of instruction possible for online settings indicates that well-designed and well-implemented online learning can be a learning experience at least as effective as classroom instruction.

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## KEY TERMS

**Audiovisual Aids:** Anything used for instruction other than speech or black-and-white printed material.

**Continuous Organizational Learning:** An organization taking responsibility for the development of workers over their entire career.

**E-Learning:** Delivery of education via electronic media such as CDROMs, audiotapes, and so forth and online learning.

**Instructional Methods:** Lecturing, reading, the use of audiovisual aids, demonstrations, discussion groups, practice by doing, teaching others, and immediate use of course material.

**Online Learning:** Instruction based on the Web.

# Online Petitions to Queensland Parliament

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## INTRODUCTION

The right of a citizen to petition Parliament is arguably one of the fundamental ways individuals can engage in democratic processes, by providing their views on what governments should do and requesting action on a particular issue.

In 2000, the Scottish Parliament agreed to a trial of an e-petitioner system whereby members of the Scottish public are able to lodge, sign and view petitions to the Scottish Parliament's Petitions Committee using the internet. Originally developed and hosted by the International Teledemocracy Centre, constituents can now place petitions on the Scottish Parliament Web site in a format that offers a discussion forum for each petition.

In 2002, the Queensland government (Australia) launched an e-democracy policy framework that introduced three digital democracy initiatives, including e-petitions. This particular initiative is presented in the case study below. A second Australian state (Tasmania) commenced a 12-month trial based on the Queensland model in July 2004. These three parliaments are the only parliaments to allow e-petitions as at October 2004, although the Canadian, Basque, European parliaments and the German Bundestag have apparently shown an interest in Scotland's e-petitioner system (MacIntosh, 2004).

Although these are only three parliaments that accept electronic petitions, online petitioning is also being used for engaging with governments and elected members. For example, in the United Kingdom, the prime minister's office accepts electronic petitions and lists those with more than 300 genuine signatures on the number 10 Downing street Web page, together with a link to the government's response to the petition. However, petitions are not hosted on that site and a separate Web site must be established to explain the purpose of the petition and to collect signatures. Fourteen petitions on a range of diverse issues were listed on the site for the period between April 2001 and July 2003, ranging from 306 to 83,440 signatures per petitioned issue.

There are also non-government Web sites providing information about, and tools for, creating online petitions. For example, www.petitiononline.com (Artifice, Inc, 2004) provides a privately sponsored free online hosting service for public petitions that includes an automatic formatting system for the Web petition; collects, displays and maintains petition signatures; automatically rejects duplicate signatures and confirms receipt to signatories; and allows for electronic delivery through e-mailing the petition URL to the target recipient. In mid 2004, the site claims over 20 million signatures have been collected on a range of topics.

## BACKGROUND: E-PETITIONING IN QUEENSLAND

The e-petitions service commenced in Queensland in August 2002 as a trial initiative. It was evaluated after 12 months of operation and became a permanent feature of the Queensland Parliament in late 2003 through the adoption of standing orders. It was designed for the purpose of making the petitioning process more transparent and responsive, to make it easier for the public to have their say on issues that are important to them, and to provide greater potential to reach a wider audience than is the case for paper petitions.

The e-petitions facility is located on a dedicated page of the Queensland Parliament Web site at www.parliament.qld.gov.au/petitions. It was developed in-house and is maintained by the Queensland Parliamentary Service. The Web site allows individuals to locate and join a current e-petition, find out information about the status of an e-petition, and view the ministerial response to the petition when it has been tabled in Parliament. A member of the public can also become a principal petitioner and initiate an e-petition, but for Parliament to host the e-petition on the site, it must be sponsored by a

*Table 1. Comparison of electronic and paper petitions (August 2002-November 2003)*

| | E-petitions | Paper petitions |
|---|---|---|
| **No. petitions** | | |
| tabled | 26 | 157 |
| closed but not tabled | 2 | n.a. |
| current | 5 | n.a. |
| **Total petitions** | **33** | n.a. |
| | | |
| **No. signatures** | | |
| tabled | 9,050 | 164,161 |
| closed but not tabled | 289 | n.a. |
| current | 517 | n.a. |
| **Total signatures** | **9,856** | n.a. |
| average no. per tabled petition | 348 | 1,046 |
| range for tabled petitions: | | |
| lowest | 11 | 10 |
| highest | 1,952 | 29,686 |
| | | |
| **Responded to in Parliament** | | |
| number of responses | 22 | 123 |
| % of tabled petitions | 84.6% | 78.3% |
| average time tabling to response (days) | 48 | 97 |

member of Parliament (MP) and checked for conformity with sessional orders by the clerk of the Parliament. Once an e-petition is closed, it is presented to Parliament by the clerk of the Parliament in hard-copy format. An e-petition is posted on the site for a minimum of one week and a maximum period of six months.

The Web site also provides a central reference point for information about the petitioning process generally. It displays all electronic petitions and all paper petitions tabled in Parliament since the commencement of the trial of e-petitions and the ministerial responses tabled in Parliament.

Key features of the petitions Web site are:

- A list of all current e-petitions showing title, subject matter, exact wording of the petition, eligibility, the principal petitioner's name and contact details, a count of signatures to date, and a closing date
- A list of closed e-petitions with the same details and also showing the name of the sponsoring MP, the date tabled and referred to the minister or the date of the minister's response together with a link to that response
- A list of tabled paper petitions with the same details as for e-petitions including a link to the ministerial response where available
- General supporting material such as information about the petitioning process, rules, conditions of use, privacy statement, and forms
- A user survey and feedback mechanism
- Links to MP contact details and information directly from the petitions page
- A "send a link" function allowing users to post the link to other individuals
- An option for signatories to select to receive an automatic e-mail notification when the ministerial response is posted

An analysis of statistics for the first 15 months of operation of e-petitions in Queensland (Henderson, 2003) showed 26 e-petitions had been tabled (compared to 157 paper petitions over the same 15-month period), a further two had closed but not yet been tabled and there were another five current e-petitions. Table 1 provides a comparison of e-petitions and paper petitions over this period. By mid-September 2004, 36 e-petitions had been tabled, two had closed but not yet been tabled and there were seven current petitions, compared with 363 tabled paper petitions.

Not surprisingly, given the relatively short period of time that e-petitions have been operating, the overall number of tabled petitions and signatures per petition over the 15-months of operation are higher for the traditional paper-based process.

It should be noted that differences between the paper-based and electronic petitioning processes will account for some of the difference between the numbers tabled over this period. The sessional orders establishing the e-petitioning system allowed only one petition "dealing

with substantially the same grievance and requesting substantially the same action by the House" to be published on the Parliament's Web site at the one time. In contrast, several copies of the one paper petition could be tabled in Parliament at different times and by different MPs. For example, the issue of horse racing cutbacks in regional and remote Queensland was addressed by one e-petition during this period, whereas three paper petitions, with the same appeal to Parliament, were tabled for the same issue.

Additionally, the difference in the number of signatures for e-petitions and paper petitions is in part due to the length of time that an e-petition can remain open for signature (i.e., six months) as compared to a paper petition, which has no time restrictions.

The e-petitioning system is not intended to replace paper petitions but rather provides an additional way via online technologies to make the parliamentary process more efficient and transparent and to improve engagement between the community and its elected representatives. An internal evaluation, which included interviews with principal petitioners, sponsoring members of Parliament, and officers of both the department and Parliamentary services, found a high level of support for the system in the community and among members of Parliament. In particular, the evaluation highlighted an increase in transparency as ministerial responses to paper petitions were also made available online.

## PRACTICE LESSONS

Major issues identified during the development and implementation of e-petitioning in Queensland were reported by Laurie (2004), for example, signature authentication, security safeguards, and technical and resource requirements. The Audit and Evaluation Services of the Department of Premier and Cabinet also identified various implementation issues in an internal evaluation of the Queensland system in 2003. Seaton (2004) describes a range of 'obstacles to success' for the development of the Scottish Parliament e-democracy initiatives (which include e-petitioning) including voter disinterest, infrastructure and home PC use, and lack of promotion of initiatives. Malina, Macintosh, and Davenport (2001) have reported an evaluation of the Scottish e-petitioner system, identifying issues such as the need to find new ways of promotion petitions and generating participation by sponsors and addressing security and confidentiality concerns by users. These analyses provide a base for developing the key practice learnings presented in the following paragraphs.

### Information Security and Privacy

Protecting the security of information and personal privacy, and establishing confidence of users that online systems are secure and that their privacy is respected, are critical issues in the take-up of online interaction with government (Lowe, 2003, Riley, 2002, United Nations Department for Economic and Social Affairs, 2003).

In Queensland, names and addresses of signatories are not published in any form on the Web site, although printed copies of tabled e-petitions are available on request from the Parliament's Table Office (which is the same process as applies for paper petitions). Queensland has an explicit e-petition data retention policy under which the personal details collected from signatories (name, address, e-mail address) are deleted after the ministerial response to the petition is tabled in Parliament or after six months of tabling of the e-petition if there has been no ministerial response in that time. The Web site makes this policy explicit in information posted on the site. There is also a detailed privacy statement on the Web site setting out how personal information will be protected. The "Conditions of Use" statement posted on the site makes explicit that breach of these conditions, such as the use of false names, amounts to a contempt of Parliament and that there are penalties for doing so.

### Authentication

Ensuring that signatures on a petition, whether in electronic or paper format, are genuine persons, meeting relevant eligibility requirements, is an important issue to prevent forged or falsified documents being submitted. Authentication is not an easy matter, given issues about personal privacy in collecting valid and verifiable personal details, and community concerns about collecting personal information online. Laurie (2004) notes that several authentication options were considered when scoping Queensland's e-petitioning process, but that no universally available or equitable means (that is, one that does not exclude eligible petitioners) for authenticating petitioner personal details in an online environment were identified.

Queensland has adopted the option of making it mandatory that petitioners supply an e-mail address. Although not providing a strong authentication standard, it needs to be considered in the context of paper petition signature authentication, where personal details provided have always been accepted at face value. In order to prevent people mass-joining e-petitions with an automatic submission program, the e-petition system has been designed to generate a unique identifier to be used in each electronic submission which is displayed

before the "sign-on" petition submission screen, must be included in the submission form, and is monitored by the program to ensure each identifier is only used once.

## Promotion

One of the most consistent challenges for online public engagement is awareness of the existence of the initiative (Coleman & Gøtze, 2001). The Queensland internal evaluation identified the need for improved marketing and education of the service, both across government and within the community. Seaton (2004) also notes more effort needs to be made to make people aware of the Scottish e-democracy initiatives and their ability to participate.

E-petitions, along with Queensland's other e-democracy initiatives, have been publicised through a range of methods, including media launches, e-mail bulletins, stalls and promotional items (such as mousepads giving the URLs for the initiatives) at major community events such as Brisbane's annual 10-day Royal Queensland Show, and presentations at community and professional forums. A new multimedia display in Parliament House also provides e-petitions and e-democracy information to 60,000 visitors, including 26,000 school children, who tour the House each year. Other avenues being explored include building e-democracy into civic education curricula to further promote awareness among children and young adults.

## Access

As with all e-democracy initiatives, universal access remains an issue, given that not everyone has ready PC access or the requisite skills and knowledge to take advantage of the opportunities offered through online engagement.

In Queensland, almost two-thirds of people have Internet access at home (Department of Innovation and Information Economy 2003), making online engagement an easily accessible avenue for the majority of Queenslanders. In Scotland, where levels of home-PC are lower, a system of free online access to the Parliament's Web site through a network of partner public libraries has been established and work is also going on to engage community groups that have online access centres (Seaton, 2004).

## Up-Take and the Importance of Demonstrating Government Responsiveness

E-petitions provide an alternative avenue to paper-based system for those people wanting to engage with governments through parliamentary processes. It also provides an opportunity to encourage participation by others who may not already engage with government through traditional methods because of barriers such as time, convenience, disability, geographic distance, or other circumstances that may be mitigated by offering online processes for engagement. An important aspect of encouraging online engagement is responsiveness, so that citizens perceive there is a genuine commitment by governments to listen and respond to matters raised through these processes. The design of the Web site can both demonstrate and be used to monitor level of commitment to doing so.

In Queensland, a core element of the e-petition process is posting of information about the Ministerial response. The Web page listing of closed petitions provides a simple-to-read table comprising title of each petition, its closing date, tabling date, date referred to the relevant minister, and date the response was tabled in Parliament, together with a direct link to the ministerial response. Petitioners also have the option of choosing to be notified by e-mail when the ministerial response is posted. Laurie (2004) notes that a major outcome of the e-petitioning process has been the increased responsiveness to petitions generally, at a rate that is much higher than in previous years. Over the first 15 months of operation, 85 per cent of e-petitions had been responded to in Parliament, taking an average of 48 days between tabling and ministerial response (Henderson, 2003).

# FUTURE TRENDS

Providing the opportunity to establish, sign, and lodge petitions online using a Web site hosted by Parliament itself is currently available in only a very small number of places. However, the experience of Queensland and Scotland demonstrates that it is a practical and useful avenue and it is likely that we will see far more examples of electronic petitioning systems in the future.

# CONCLUSION

A case study of e-petitioning in Queensland (one of the only three parliamentary e-petitioning systems operating at mid 2004) showed that online petitioning processes provide a practical and effective avenue for engagement. Key practice lessons derived from implementation of the Queensland and Scottish systems relate to information security and privacy, signature authentication, promotion and awareness, universality of access, and demonstrating government responsiveness.

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## KEY TERMS

**Community Engagement:** Involving citizens in government planning and decision-making.

**E-Petition:** A petition published on the Web before being formally lodged.

**E-Democracy:** The use of information and communication technologies in democratic processes.

**ICTs (Information and Communication Technologies):** The class of technologies that allows the processing, storage and communication of digital information, including networked and portable computer systems, advanced mobile telephone systems and services, interactive digital television, and similar applications.

**Petition:** A signed statement from a person or group of people making a formal request to Parliament about a particular issue or law.

**Queensland Electronic Petitioning System:** An ICT-enabled process for initiating, signing, and lodging of public petitions with the Queensland Parliament.

# Open Source in Government

O

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## OPEN SOURCE

Open source software (OSS) is computer software that has its underlying source code made available under a licence. This can allow developers and users to adapt and improve it (Raymond, 2001). Computer software can be broadly split into two development models:

- Proprietary, or closed software, owned by a company or individual. Copies of the binary are made public; the source code is not usually made public.
- Open-source software (OSS), where the source code is released with the binary. Users and developers can be licenced to use and modify the code, and to distribute any improvements they make.

Both OSS and proprietary approaches allow companies to make a profit. Companies developing proprietary software make money by developing software and then selling licences to use the software. For example, Microsoft receives a payment for every copy of Windows sold with a personal computer. OSS companies make their money by providing services, such as advising clients on the GPL licence. The licencee can either charge a fee for this service or work free of charge.

In practice, software companies often develop both types of software. OSS is developed by an ongoing, iterative process where people share the ideas expressed in the source code. The aim is that a large community of developers and users can contribute to the development of the code, check it for errors and bugs, and make the improved version available to others. Project management software is used to allow developers to keep track of the various versions.

There are two main types of open-source licences (although there are many variants and subtypes developed by other companies):

- **Berkeley Software Distribution (BSD) Licence:** This permits a licencee to "close" a version (by withholding the most recent modifications to the source code) and sell it as a proprietary product;
- **GNU General Public Licence (GNU, GPL, or GPL):** Under this licence, licencees may not "close" versions. The licencee may modify, copy, and redistribute any derivative version, under the same GPL licence. The licencee can either charge a fee for this service or work free of charge.

Free software first evolved during the 1970s but in the 1990s forked into two movements, namely free software and open source (Berry, 2004). Richard Stallman, an American software developer who believes that sharing source code and ideas is fundamental to freedom of speech, developed a free version of the widely used Unix operating system. The resulting GNU program was released under a specially created General Public Licence (GNU, GPL). This was designed to ensure that the source code would remain openly available to all. It was not intended to prevent commercial usage or distribution (Stallman, 2002). This approach was christened free software. In this context, free meant that anyone could modify the software. However, the term "free" was often misunderstood to mean no cost. Hence, during the 1990s, Eric Raymond and others proposed that open-source software was coined as a less contentious and more business-friendly term. This has become widely accepted within the software and business communities; however there are still arguments about the most appropriate term to use (Moody, 2002).

The OSMs are usually organised into a network of individuals who work collaboratively on the Internet, developing major software projects that sometimes rival commercial software but are always committed to the production of quality alternatives to those produced by commercial companies (Raymond, 2001; Williams, 2002). Groups and individuals develop software to meet their own and others' needs in a highly decentralised way, likened to a Bazaar (Raymond, 2001). These groups often

*Table 1. A summary of open-source applications and technologies*

| |
|---|
| • Web sites (e.g., Apache) |
| • Network infrastructure (e.g., BIND, Sendmail) |
| • Operating systems (e.g., GNU/Linux, FreeBSD) |
| • Applications software (e.g., GIMP) |
| • Group network ssoftware (e.g., Drupal) |
| • Business systems (e.g., Amazon.com's Web site) |
| • Distribution/peer-to-peer filesharing |

*Table 2. A list of reasons for utilizing open source in government*

- To enable transparency
- To save money
- To maximize alternative providers interoperability
- To improve software standards
- To provide timely public interest data
- To facilitate a competitive software market
- To avoid vendor lock-in
- To ensure open standards are implemented
- To allow security and coding checks to be made visually
- To optimize equipment
- To connect to other government to government (G2G) systems

make substantive value claims to support their projects and foster an ethic of community, collaboration, deliberation, and intellectual freedom. In addition, it is argued by Lessig (1999) that the FLOSS community can offer an inspiration in their commitment to transparency in their products and their ability to open up governmental regulation and control through free/libre and open source code.

## CRITICAL ISSUES OF OPEN-SOURCE SOFTWARE

Advocates of OSS argue that, because it harnesses a large team of developers, bugs and errors can be rapidly spotted and fixed, thus increasing reliability and security. They also say that having a large team means that OSS is by necessity "modular" (made up of discrete units, each with a specific function). Modularity simplifies software design and can increase the reliability as well as flexibility of software (Statskontoret, 2003). Advocates also argue that, by making the source code available with the software, there is no danger of "lock-in" because document formats are transparent. However, critics point out that proprietary software can also have a high degree of reliability, flexibility, and security and can also conform to open standards.

Many commentators argue that OSS projects can suffer from weak project management (because of their products' complex development structure) and that OSS can be difficult to use. The OSS community point out that new project management tools are being introduced and that efforts are being made to increase the user-friendliness of OSS desktop applications. There are often concerns that OSS is unsupported and contains unauthorized intellectual property (IP) belonging to third parties. However, the OSS community say this can also be the case with proprietary software. Moreover, large firms such as IBM and Hewlett Packard now manage open-source projects and indemnify users to give them added insurance (e-Government Unit, 2004).

There is broad acceptance that OSS and proprietary software are comparable in terms of software quality. It is acknowledged that switching costs can be high, whichever software model is used. There are conflicting reports on how total cost of ownership (TCO) varies for the two models. It is widely agreed that TCO should be evaluated only on a case-by-case basis. Many analysts believe that there is increasing symbiosis between the two models. For example, modularity is now seen as an important factor in the development of both proprietary and OSS. New project management tools are being used to manage both types of software projects.

Worldwide, the uptake of open source has been variable, with some countries taking a more proactive approach encouraging such use (e.g., Brazil) and others a more neutral position (e.g., the United Kingdom) (CSIS, 2004; OGC, 2004). With government budgets increasingly stretched and with increasing needs for interoperability both internally as joined-up government and externally as government-to-government (G2G) data systems, open

*Table 3. A summary of critical issues in open source*

**Total Cost of Ownership**
Debates are still ongoing about the best method of comparing the costs of proprietary vs. open source.

**User Ignorance and Perceptions**
Lack of adequate understanding of the open source and it usefulness. User reluctance to retrain on the new software.

**Support**
There is some reluctance to trust anarchic groups on the Internet for the future support of a software product, although this is belied by the amount of corporate support (e.g., IBM, HP) that now exists.

**Software Patents**
Software patents are widely seen to be detrimental to the open-source development method. Currently software is not patentable, although the EU has been discussing a new directive to clarify its position.

**Government Support**
It is difficult to persuade departments to move away from "known" products to lesser known open-source ones.

**Project Management**
Dispersed development means that care has to be taken with the management of open-source projects in the public sector.

**Maintaining and Integrity of Data**
Maintaining up-to-date and accurate information on the site for viewers to use. Open standards and open source are seen as contributory to this effort.

**Security**
Maintaining secure and safe systems and keeping unauthorized user access out.

**System Incompatibilities**
Cross-platform incompatibility that prevent particularly between proprietary and open-source components.

source is thought to take an increasingly larger role in government ICT systems, particularly contributing as part of large infrastructural projects where common users would not need to experience the less developed user-interfaces of open-source software (Hahn, 2002; Weber, 2003, 2004).

## CONCLUSION

Open source is now a mature and useable technology that is being explored by many businesses and governments around the world (DiBona, Ockman, & Stone, 1999; Rushkoff, 2003). Its methods have begun to revolutionise software production and enabled many of the dot-com corporations to take off with impressive results (e.g., Amazon.com) (Lessig, 1999). Its use in government is still under consideration and much opposition from existing market suppliers, although now a more pragmatic attitude seems to be prevailing. Its most interesting possibility is the transparency it offers in allowing citizens to read and check the basic data processing functions of government (Chadwick, 2003; Lenk, 1999; Nissenbaum, 2001; Van de Donk, Snellen, & Tops,1995). Use of open source in government is expected to increase over the next decade as the growing data processing needs push more efficient and cost-effective use of existing hardware together with greater needs for interdepartmental interoperability (Economist, 2003; Lerner & Tirole, 2002). Increasingly, open source is also becoming an international relations issue (e.g., China, Brazil) as it allows countries to develop expertise in computer processing and development and avoid expensive (usually American) licensing costs (Moody, 2002; Weber, 2004).

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## KEY TERMS

**Binary:** The compiled source code that is machine-readable and executable. Can be executed on the computer without the need for the underlying source code. Usually distributed alone as proprietary software and with the source code as free software or open source.

**Code:** The programming source code, sometimes referred to as the crown jewels due to the fact that the source code contains all the intellectual property and programming logic needed to implement the software.

**Copyleft:** A clause in the GNU GPL that limits the use of free software unless modifications and distributions are released with the source code included. Prevents the closure of the software into a proprietary software product.

**Copyright:** The key legal instrument that protects the underlying intellectual property in both open-source and free software.

**Distro:** Distribution companies that specialize in distributing free or open-source software.

**Free Software**: Software distributed with source code that adheres to the terms of the GNU General Public License (GPL).

**GPL:** The General Public License. Issued by the Free Software Federation (FSF) to release free software under a copyright license.

**Open Source:** Software distributed with source code that adheres to the terms of an open-source license (such as the GPL or the BSD license). The differences between open-source and free software generally refer to the "copyleft" clause of the GNU GPL.

**Open Standards:** Clear documented interoperability guidelines that allow different software products to work together. Supported by open-source, free software, and proprietary software vendors.

**Proprietary:** Software that does not include the source code as part of the software product (i.e., as binary) or distribution (e.g., Microsoft Word).

**Source Code:** Human readable textual documents that contain the basic functional algorithms of the software and designate the flow of operation and functional capacities. Compiled into binary files to be run on computers.

# Open-Source and Public Sector Environmental Information Services

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## INTRODUCTION

Free open/source software (FOSS) is a new software development paradigm that emerged in the last decade and relies directly on the volunteer efforts of geographically dispersed developers of varying professional affiliations and proficiencies, that are coordinated in ad-hoc schemes, based on recognition of the work carried out by relevant "core groups" of volunteers, and follow pragmatic directions, emerging from community feedback.

In direct contrast with previously established business practices (Raymond, 2000), this software development paradigm is fuelled by full disclosure of the source code, volunteer effort, and a number of "freedoms" granted to the software user regarding his ability to interact with the software and propagate its use.

By promoting code reuse and the adaptation of freely available best practices, FOSS development practices minimize redundancy and concentrate "investment" on innovation (Von Hippel & Von Krogh, 2003). The support FOSS projects receive, from the user-developer community, serves to provide guidance, reduce maintenance costs, and enhance software sustainability, while the service-oriented model of FOSS allows for a broad range of contractors to provide support, and helps in minimizing the total cost of ownership.

It is these characteristics FOSS, as we will demonstrate in this article, that render it flexible, economical and reusable, and thus appropriate for use in building publicly funded information and communication technology (ICT) projects (Infonomics, 2002), especially those aiming at the dissemination of information to citizens, such as online environmental portals.

*Table 1. Salient moments in FOSS history*

| | |
|---|---|
| **1985** | Richard Stallman creates Free Software Foundation and GNU project |
| **1989** | First version of the GNU General Purpose License; Berkeley CSRG releases TCP/IP code under proto-BSD license |
| **1991** | Linus Torvalds releases Linux kernel v0.01 to the public; Berkeley Net/2 distribution released, results in a lawsuit by UNIX owner AT&T against University of Berkeley and BSDI |
| **1994** | BSD lawsuit settled, 4.4BSD-Lite first legally Open Source Unix version; becomes starting point of all *BSD distributions |
| **1997** | "The Cathedral and the Bazaar" is published by Eric Raymond |
| **1998** | Netscape opens Navigator source; Open Source term is coined; Bruce Perens and Eric Raymond launch Open Source Initiative |
| **1999** | Apache Software Foundation formed |

## BACKGROUND

### Free/Open Source Software: Definition and History

FOSS represents a software development paradigm, and as such, it is fairly new, compared to its precursors whose roots go back to the 50s and 70s. Historically, although the software model itself could be said to derive from the UNIX operating system, the FOSS development community, and underlying ideological movement is a little more than a decade old. Table 1 recaps some of the salient moments in FOSS history.

The FOSS development community consists of individuals, or groups of individuals, who contribute to a particular FOSS product or technology: as a consequence of the previous statement, this also includes the users of the software. Although referencing various forms of voluntary affiliation around FOSS projects, the community is the driving force of FOSS software development. It constitutes a community of practice (CoP) (Kimble, Hildreth, & Wright, 2001), and its motivations and processes have been recorded elsewhere in detail (Ghosh, 2003; Lerner & Tirole, 2001; Shah, 2003). CoP's are described as "intrinsic conditions for the existence of knowledge," (Lave & Wenger, 1991) attested to by the fact that the FOSS community provides fertile ground for user-consumer involvement in online joint innovation (Hemetsberger, 2003). The FOSS process refers to the approach for developing and maintaining FOSS products and technologies, including software, computers, devices, technical formats, and computer languages.

The terms open-source and free software refer to software developed and distributed on largely common principles. The definition of free software recognizes some fundamental freedoms as imparted by the author

*Table 2. PSI in European legislation*

| | |
|---|---|
| **1990** | Dir. 90/313/EEC on public access to Environmental Information is adopted |
| **1998** | UNECE "Aarhus" Convention |
| **1999** | EU Green Paper on PSI is published |
| **2000** | eEurope 2002 Action Plan adopted |
| **2001** | "Aarhus" Convention enters into force |
| **2002** | Proposal on Directive for reuse of PSI |
| **2003** | eEurope 2005 Action Plan adopted<br>Directives 2003/98/EC, 2003/4/EC, 2003/35/EC adopted<br>WSIS Action Plan and financial support scheme adopted |
| **2004** | Proposal 2004/0175 on INSPIRE Directive adopted |
| **2005** | i2010: European Information Society 2010 |

(Stallman, 1999) to the user, inside a license agreement; namely the freedom to run, redistribute, study and improve, or adapt the program according to specific needs. The open source definition (Perens, 1998) further extended these principles and focused on the development process rather than the political ideology underlying the free software movement.

Unrestricted access to the software source code is a precondition for most of the aforementioned freedoms, and the usefulness and reuse potential of FOSS is dependent on the continual revision and adaptation of its source code. In proprietary and closed development environments, the frequency of revisions is dominated by the sales cycle but can also be stilled by managerial decree. In FOSS, the "life expectancy" of software, is a direct outcome of its popularity with developers, who will choose to devote time to improve functionality, and users, who will provide constant feedback to developers on needed improvements and fixes.

## International and European Public Sector Information Policy Initiatives

The public sector information (PSI) sector represents a considerable part of the information production "market" and has been using non-negligible funds to support this production, in order to serve the public, while supporting authorities and various decision-making bodies in their administrative tasks: PSI is an important component of the content market and a key economic resource for commercial exploitation. The size of the European content industry is some 433 billion euro, about 5% of European GDP. It is estimated that 12% to 25% of the data used in e-Commerce is sourced from PSI. PSI is therefore a prime content resource (Davies, 2005), while Environmental Information accounts for a considerable percentage of PSI produced (> 50%). This information corpus, produced on the basis of various legislative mandates, is usually disposed to a physical or electronic archive, which is rarely revisited and re-used, although it represents a considerable public investment. By the introduction of online services (e-government, e-health, e-learning, etc.), governments promote the public interest for enhanced efficiency and effectiveness (European Commission, 2004) and become themselves important suppliers and users of ICT's, thereby influencing their take up.

Within the EU, a variety of important policy initiatives have been undertaken towards the development of a framework for the definition, access and usage of PSI, Environmental Information being the most prominent and massive part of the PSI corpus. The most important of these initiatives are listed in Table 2, while some of them are presented in detail hereafter.

### World Summit on the Information Society 2003 Action Plan

The objectives of the World Summit on the Information Society Plan of Action (World Summit on the Information Society, 2003) are "to build an inclusive Information Society; to put the potential of knowledge and ICTs at the service of development; to promote the use of information and knowledge for the achievement of internationally agreed development goals, including those contained in the Millennium Declaration; and to address new challenges of the Information Society, at the national, regional and international levels." To this end, the Action Plan calls on governments to take action, in the framework of national development policies, in order to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services. Measures to that direction include establishing legislation on access to information and the preservation of public data; instituting policy guidelines for the development and promotion of public domain information as an important international instrument promoting public access to information; creation of digital public libraries and community public access points; facilitating access to journals and books, with special care taken to promote accessibility for all, including disadvantaged, marginalized and vulnerable groups, and using affordable technologies and non-text based computer interfaces.

Although the WSIS action plan does not explicitly mention FOSS as a key element in developing an "information society for all," its potential in reinforcing the policies proposed in the Action Plan is underscored in a variety of its articles, as well as stated directly in peripheral texts, such as the Tokyo Declaration (UNESCAP, 2003), which declared that "development and deployment of open-source software should be encouraged, as appropriate, as should open standards for ICT networking."

### eEurope 2002 and 2005 Action Plans

The central message of the eEurope 2002 Action Plan (European Parliament, 2002) was that the digital, knowl-

edge-based economy is a powerful engine for growth, competitiveness and the generation of employment, while at the same time improving citizens' quality of life (European Commission, 2002). The Action Plan outlined eleven key areas where effort should be concentrated in order for all three pillars of the Lisbon Strategy to be fully implemented in ICT policy. Following on its heels, the objective of the eEurope 2005 Action Plan (European Commission, 2002a) was to provide a favourable environment for private investment and for the creation of new jobs, to boost productivity, to modernise public services (e-government, e-learning, e-health), and to provide equal opportunities for participation in the global information society. eEurope 2005 therefore aimed to stimulate secure services, applications, and content based on a widely available secure broadband infrastructure. It should be noted that a key target of the Action Plan was the development of interactive public services, accessible for all, and offered on multiple platforms.

## Directive 2003/98/EC on the Reuse of Public Sector Information

The Directive (European Parliament, 2003b) identifies public sector documents as an important primary material for digital content products and services, in the evolution towards an information and knowledge society, one that will become an even more important content resource with the development of wireless content services.

The Directive states that:

*Making public all generally available documents held by the public sector—concerning not only the political process but also the legal and administrative process—is a fundamental instrument for extending the right to knowledge, which is a basic principle of democracy. This objective is applicable to institutions at every level, be it local, national or international.*

To this end, it outlines the conditions for reuse of public sector documents, while emphasizing the need for broader cross-border geographical coverage of PSI underpinning community-wide services and the opportunities for European companies to exploit its potential and contribute to economic growth and job creation.

The explanatory memorandum for the proposal on the Directive outlines the reasoning behind the need for reuse of PSI:

*Citizens and businesses alike can greatly benefit from a good provision of (public sector) information on the Internet. It will facilitate their communication with the public administrations and can increase their participation in the democratic process. Public sector information is very important for democratic and civic life. Equally, public sector information is a key resource for economic activity and proper functioning of the internal market. By increasing the use of public sector information, it is expected that better quality information will be used by a larger group of citizens and companies and that it will allow them to better take advantage of their rights in the internal market.*

The Directive recognizes that the considerable differences in the rules and practices of Member States relating to the exploitation of PSI resources constitute barriers to bringing out the full economic potential of this key document resource and proposes that minimum harmonisation and adoption of a general framework for the conditions governing reuse should be undertaken at the community level. It should be noted that the Directive does not mandate reuse in any way, and does not refer to computer programs.

## European Legislation Focus: Public Access to Environmental Information

Based on the production and distribution of various products and services, the emerging global knowledge economy depends critically on networks, information flows, and technological diffusion. In this economic environment, information mastery and the introduction of knowledge-intensive services and means of production have become keys to a city authority's, a company's and even a country's competitiveness and effective performance. In this context, public sector information, and more specifically environmental information (EI), is continuously being produced (via measurements, mathematical models, human experience, telemetry, etc.), but only parts of are used, sometimes only once. Moreover, EI provides a tangible incarnation of PSI and the sensibilities attached to the state of the environment in recent years have led to a practical need for the timely and authoritative dissemination of environmental information to citizens and decision makers. By the adoption of Council Directive 90/313/EEC on freedom of access to information on the environment, on 7 June 1990, the EU pioneered the global movement to promote citizen awareness and increased participation in decision-making processes by advocating public access to PSI.

The "Aarhus Convention" on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (UN Economic Commission for Europe, 1998), drafted by the UN Economic Commission for Europe (UNECE) and adopted by the EU on 25 June 1998, placed obligations on public authorities to ensure greater public participation in environmental issues and easy access to justice if these rights are

denied. It called for effective dissemination of environmental information as well as greater transparency in decision-making procedures. In accordance with the convention and in line with the new technological developments and needs for updating the environment related legal framework, two "pillar" Directives concerning access to environmental information (Directive 2003/4/EC) and public participation in environmental decision-making (Directive 2003/35/EC), were adopted by EU Member States earlier in 2003, and provide for a Europe-wide harmonised framework fully in line with its ambitious standards. From an implementation standpoint, The "Aarhus Convention", along with its "pillar" Directives can be seen as a successful application, on all levels (e.g., global, European, local) of the principle of fostering increased public participation to the decision making process through promoting access to PSI, as it was first expressed in Directive 90/313/EEC.

The frameworks presented above, taken in conjunction with EU legislation that underlines the extended need for efficient environmental management with the support of appropriate tools (as in the so called Air Quality Framework Directive 96/62/EC), as well as the initiatives outlined in the previous section, point to the conclusion that electronic services provide the means for making best use of the abundance of EI produced by supplying tools to retrieve, structure, display and process related data, and by providing added value services on the basis of EI. It is interesting to note that these "targets" are within the vicinity of the goals of FOSS development and application, as discussed in the following chapter.

## FOSS AND ENVIRONMENT RELATED QUALITY OF LIFE SERVICES

### Benefits of FOSS Use

The use of FOSS software towards building environment related quality of life services hinges on three points (Schmitz & Castiaux, 2002) providing benefits to users, developers, and operators of the software: economy, quality, and philosophy.

- **Economy:** Reusing and adapting freely available best practice software, instead of resorting to monolithic proprietary solutions or developing everything from scratch leads to minimizing redundancy in development efforts and by extension, in concentrating investment on innovation. Relying on the community to spark developer interest in the software and provide user feedback reduces maintenance costs and prolongs its' useful life cycle. A corollary of this is that the functionality and maintainability of the software is not impaired by artificial limitations (i.e., not intrinsic to the software itself), such as expiring licenses and financial plights affecting a single developing entity. The total cost of ownership (TCO) of solutions based on FOSS from a contractor point of view is alleviated (European Working Group on Libre Software, 2001; Kenwood, 2001), since consulting fees are fully useful expenditures, in contrast with licensing fees which mostly serve as instruments of amortization for developing companies. Since public sector information services development is largely supported by public funding, such amortization should not burden beneficiaries of their services. For the service-oriented model of FOSS, it should be noted that costs of support and maintenance can be contracted out to a range of suppliers, as per the competitive nature of the market ensured by source code disclosure (Lerner & Tirole, 2001):
- **Quality:** The main objective in software engineering is not necessarily to spend less but rather to obtain a higher quality for the same amount of money, and aim to enforce the best possible safeguards for quality and safety in the product. Avoiding to "reinvent the wheel" by using funds to develop new applications rather than re-inventing already developed parts, speeds up technological innovation -as is also the case with the increased cooperation and full source code disclosure and availability required by FOSS tenets. Moreover, the model used for software development, while operating outside a "traditional" organization. Finally, as has been repeatedly demonstrated in recent years (Perens, 2001; Schneier, 2001), software security concerns are better addressed through a continuous process of issue disclosure and user-developer cooperation in order to overcome them
- **Philosophy:** Global public goods are non-excludable, non-rival, trans-boundary advantages to society from the provision of certain utilities and from satisfying particular wants and needs such as the elimination of pollution that can be broadly classified into five main types: environment, health, knowledge, peace and security, and governance (European Commission, 2002b; Gardiner & Le Goulven, 2002). The FOSS process can be said to present the potential for a "Social Return of Investment" on public funding, by virtue of its' ability to produce non-monetizable benefits for society, in the form a body of code that can be utilized in building sustainable informatics infrastructures for the public. We argue therefore that FOSS constitutes in itself a

global public good of knowledge, while at the same time presenting the potential to further the production of global public goods of all types. Reliance on proprietary software for science results in vendor "lock-in" as regards to data formats, making it difficult to pursue common protocols for data interchange and storage, for instance, as it is required by modern systems dealing with the problems of environmental data heterogeneity (Visser, Stuckenschmidt, Wache, & Vögele, 2001). In contrast, FOSS developers and proponents promote the use of open scientific standards, through their use in applications, as a means of consolidating researcher efforts, minimizing the cost and dependencies of technical innovation. In addition, the FOSS software movement serves the further collaboration between public bodies, professional communities and the private sector in the interests of creating a flexible and lasting service environment for the public. The free dissemination of technological advances (both in terms of cost and material availability) relating to informatics services, although not a panacea, can be seen to eventually help eclipse the digital divide (Schauer, 2003), by allowing poorer countries to "catch up."

## FOSS in Government: Timeline

Due to the benefits outlined in the previous paragraph, FOSS has seen increased rates of adoption by governments and supranational organizations in recent years. Hahn (2003) catalogues the main actions in support of FOSS by governments around the world, ca. 2003. A more comprehensive chart, providing information on the number and type of FOSS software policies and legislation considered by national, regional, or local governments around the world is being published by the Center for Strategic and International Studies (Lewis & Keiber, 2004) and updated regularly. It looks at whether the policy or legislation mandated the use of, expressed a preference for, encouraged the use or commissioned research into FOSS.

The European Commission has supported a number of initiatives (http://europa.eu.int/information_society/activities/opensource/) in the FOSS domain since 1998, with initial steps conducted through the creation of the Working group on Libre Software. The 6th Framework Programme of Information Society Technologies work programme for 2003-2004 stated that "The development of open standards and open source software will be encouraged when appropriate to ensure interoperability of solutions and to further innovation."

Table 3 provides an abbreviated timeline of the use of FOSS in conjunction with European PSI, as relevant to the context of this article, and in relation to FOSS associated legal and regulatory actions.

## Case Studies: FOSS and Public Sector Environmental Information Services

In the following section, we present a couple of informatics projects (funded under EC initiatives) that strove to produce environmental-ecological information services for public use. Proceeding from the early recognized need for open architectures, platform independence and common data protocols, these systems gradually came to fulfill and embrace the philosophy and principles of the FOSS model.

### The APNEE/APNEE-TU Projects

The APNEE project (http://www.apnee.org) (Bøhler, Karatzas, Peinel, Rose, & San Jose, 2002; Karatzas, 2004) contributed to the European research on public information systems and services, by developing citizen-centered dynamic information services aimed at providing intelligence about the ambient environment. These services advise the citizen about the air quality in terms of an air quality index and offer guidelines for behavioural change. Awareness services are based upon an array of information channels to reach the citizen. APNEE further utilises various intuitive presentation formats to convey information. The configuration of such ambient technologies and the selection specific information channels has been evaluated in field trials in different European regions.

It was apparent from the beginning of the APNEE project that a flexible, modular and cost-effective architecture was needed, to support the environmental information needs of urban agglomerations through easy-to-use and easy-to-access interfaces that would allow a measure of personalization/customization in order to prove attractive to citizens. For this reason, development of the APNEE regional server was based on FOSS technologies.

APNEE/APNEE-TU is composed of a set of reference core modules, including the database, the service triggers, the regional server application and basic functionality modules (licensed as FOSS), as well as proprietary extension modules developed by telecommunication partners to provide services based on local ICT infrastructure conditions. The environmental database forms the backend of all APNEE-TU services and consists of a schema for environmental data series, as well as warnings, medical advice, pollutant information; spatial data for the WebGIS component, and personalization data for subscribers. APNEE-TU provides an object-relational persistence layer to allow cooperation with a variety of FOSS and commer-

*Table 3. UN/EU FOSS related actions, ca. 2005*

| | |
|---|---|
| **2001** | European Working Group on Libre Software report "Free Software / Open Source: Information Society Opportunities for Europe" is published; UNESCO introduces Free Software Portal |
| **2002** | EU-sponsored Infonomics Institute study introduces FLOSS aggregate term; "Pooling Open Source Software" feasibility study by IDA is published; Danish Board of Technology report highlights potential for major public savings in open source software |
| **2003** | IDA establishes the Open Source Observatory |
| **2004** | EC announces Open Standards Definition; UNDP/APDIP International Open Source Network established |
| **2005** | IST/FP6 FLOSSWorld project allocated 660.000€, involving 17 partners in 12 countries worldwide, aimed at promoting global collaboration on FOSS |

cial RDBMS systems. The regional server is the centrepiece of the APNEE platform, providing a Web-based anchoring point for APNEE services, configured and localized as per the needs of each installation site, as well as administrative interfaces for a variety of functionalities, such as subscription to the newsletter, and email services. Push services consist of modules that are triggered by changes in the database, sending SMS and email alerts and warnings to the citizen periodically, or upon user specified conditions. Pull services respond to applications requesting information from the database, including requests made from users via WWW, PDA, or WAP, and requests from automatic processes using Web Services interfaces.

In recognition of the value of the FOSS software paradigm towards building informatics systems for the public, and in order to preserve and disseminate development efforts, the APNEE-TU project produced a "reference implementation," composed of the environmental database, regional server and core modules, which is licensed as FOSS.

## The EIONET Open-Source Software

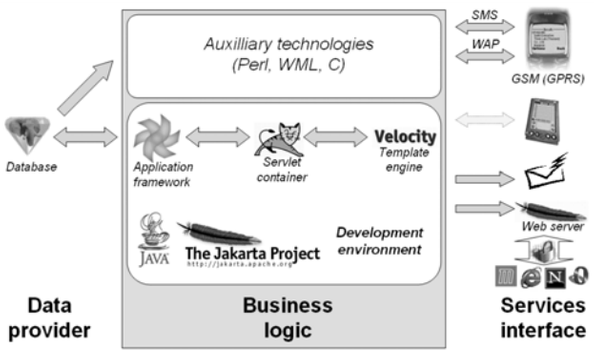
Another interesting activity in the area of FOSS usage for environmental information exchange and related information services, comes from the European Environment Agency (http://www.eea.eu.int). In the frame of its activities, EEA decided to release a major portion of the software developed as part of, or in relation to the European Environmental Information and Observation Network (EIONET, http://www.eionet.eu.int/), as open-source software. The first release came on March 2004, and took into account the series of standards on Information Technology and Metadata Registries (ISO/IEC 11179, http://metadata-standards.org/11179/). It is worthwhile to note that the decision by EEA to support open source was mainly aimed at promotion of code reuse, supporting freedom of software development, protecting the investment already made by EEA for the creation of the software, and introducing open-source peer-review procedures to the software modules published.

# FUTURE TRENDS

On 1 June 2005, the i2010 initiative was launched by the European Commission, with the stated aims to create an open and competitive single market for information society and media services within the EU, to increase EU investment in research on information and communication technologies (ICTs) by 80%, and to promote an inclusive European information society. During the 5th European Information Society Conference that followed June 2-4, local government representatives from across Europe adopted the Krakow Declaration on Local Agenda i2010 and the promotion of digital solidarity among the cities of the world (CCRE, 2005). The declaration participants stressed the importance of ensuring broadband access, with an eye on promoting PSI use, and of strengthening the enabling role of local and regional administrations in guaranteeing adequate and secure technological infra-structure and in promoting ICT-based inclusive services and applications. To these ends, participants suggested a set of goals as part of the i2010 Local Agenda, to be implemented in all European countries. Goal 1 focuses on the need to support and implement policies in regions and local areas ensuring broadband access to online services for all citizens in Europe by 2010, while Goal 8 specifically mentions the need to expand the use of open source software and open standards in the public sector to increase e-government interoperability nationally and within Europe.

In addition, developments in the semantic Web and ontology sectors that are related to the environmental sector, have been recorded via the number of IST FP6 projects that include these issues in their objectives (http://www.cordis.lu/fp6), while a service-oriented need is emerging, concerning electronic information providence for quality of life, as suggested by the growing number of related services (weather, traffic etc.) which are provided via Web portals and mobile phone operators. Thus, it is expected that the environment-related public sector will serve as core content provider for human-centered electronic information services in the future, that will address individual needs on the basis of semantics defined on an individual level. These needs, when combined with cost limitations and flexibility-adaptability requirements, provide sufficient justifications for the usage of FOSS to support the creation and operation of PSI oriented, environment related, personalised, electronic information services for the support of quality of life and the advance of decision making towards achieving sustainability goals and enhance business perspectives for the ICT market.

*Figure 1. The APNEE-TU services architecture materialisation for Thessaloniki, Greece*




## CONCLUSION

European policy on public sector information, and more specifically information related to the environment, has been strongly suggesting its exploitation for the creation of citizen oriented services, in the frame of empowering democracy and participation, and towards enhancing efficiency and effectiveness of the public sector. In addition, the recent developments attesting to the popularity and usage of FOSS by governmental bodies and agencies, and organisations related to the environment, provides proof of concept concerning the creation of quality of life information services on the basis of free/open-Source software. The need of the citizen to be informed and aware about environmental issues is supported by the legislative framework concerning the relevant right of access, and leads to the conclusion that citizens should also have the right of having access to freely available information and informatics infrastructures and resources, that allow for the creation of personalised services, having direct impact to the living conditions and supporting e-participation and e-governance. This may allow for the "transformation" of citizens from "passive" consumers of information services to active participants in a society based on e-democracy.

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## KEY TERMS

**Community of Practice (CoP):** Organizational development concept referring to the process of social learning that occurs when people who have a common interest in some subject or problem, collaborate to share ideas, find solutions, and build innovations.

**Free/Open Source Software (FOSS):** Hybrid term that refers to both Free Software and Open Source Software, which is useful due to an unresolved dispute for the naming of the aggregate movement.

**Information and Communication Technology (ICT):** refers to both computer and communication technology. IT (or information technology) is defined as any equipment or interconnected system (subsystem) of equipment that includes all forms of technology used to create, store, manipulate, manage, move, display, switch, interchange, transmit or receive information in its various forms. Information can be in the form of: business data; voice conversations; still images; motion pictures; multimedia presentations and other forms including those not yet conceived. The meaning of communication refers to a system of shared symbols and meanings that binds people together into a group, a community, or a culture.

**Personal Digital Assistant (PDA):** A small, portable computing device, generally handheld, with a small screen that allows various input modes.

**Public Sector Information (PSI):** The public sector collects, produces, reproduces and disseminates a wide range of information in many areas of activity, such as social, economic, geographical, weather, tourist, business, patent and educational information.

**SOAP:** A standard XML-encoded remote procedure call protocol over HTTP; SOAP forms the foundation layer of the Web services stack, providing a basic messaging framework that more abstract layers can build on.

**Total Cost of Ownership (TCO):** The effective, combined cost of acquisition and deployment of an information technology throughout all its perceived useful life (EWGLS 2001).

**Wireless Application Protocol (WAP):** Open industry standard for mobile Internet access.

**World Summit on the Information Society (WSIS):** A UN-sponsored global conference about information and communication, organized by ITU.

**XML-RPC:** A very simple remote procedure call protocol encoded in XML.

# Open-Source Solution to Secure E-Government Services

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## INTRODUCTION

Nowadays, a global information infrastructure connects remote parties through the use of large scale networks, and many companies focus on developing e-services based on remote resources and on interactions between remote parties. In such a context, e-government (e-gov) systems became of paramount importance for the public administration, and many ongoing development projects are targeted on their implementation, security, and release (Bettini, Jajodia, Sean Wang, & Wijesekera, 2002). For open-source software to play an important role in this scenario, three main technological requirements must be fulfilled: (1) the identification and optimization of de facto standards for building e-gov open-source software components, (2) the adoption of open-source techniques to secure e-gov services and (3) the standard integration of these components into an open-source middleware layer, capable of conveying a completely open-source e-gov solution. This article highlights that e-gov systems should be constructed on an open-source middleware layer, providing full public responsibility in its development. The role of open-source middleware for secure e-gov services deployment is discussed, focusing on implementing a security environment without custom programming. An alternative solution is given and consists of the adoption of a stand-alone architecture that fulfils all security requirements.

## BACKGROUND

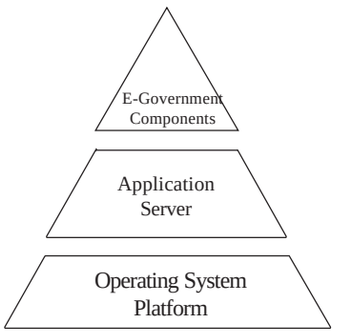
Accessing information on the global Net has become a fundamental requirement of the modern economy. Recently, focus has shifted from access to traditional information stored in WWW sites to e-services such as e-gov services, remote banking, or airline reservation systems (Corallo et al., 2005; Feldman, 2000).

In particular, the perceived importance of e-gov services is growing (Ardagna, Cremonini, Damiani, De Capitani di Vimercati, & Samarati, 2005). Today, e-gov services provide various kinds of functionalities to individual citizens and companies alike (e.g., paying fines, answering registry office requests, releasing authorizations, and so forth). It is widely acknowledged that e-gov services should follow a layered software structure that is outlined in Figure 1 (Ardagna, Damiani, Frati, and Montel, 2005; Damiani, Grosky, & Khosla, 2003). The structure depicted as follows is composed of three layers, where the first comprises a community of software components, managed by an application server (second layer) in turn running on an operating system platform (third layer). Specifically, the three levels are:

- **E-Government Components Layer:** All software components that implement e-gov services.
- **Application Server Layer:** Middleware over which the application will be deployed. It provides some additional functionalities such as management of security, clustering and persistence. In this manner, the developer can focus on the implementation of application components.
- **Operating System Platform Layer:** The operating system platform over which the application will be distributed.

Many proprietary e-gov projects are affected by budget, transparency, vendor lock-in, integration, and interoperability limitations that represent main crucial problems affecting e-gov applications; also, the European public

*Figure 1. E-Government's three-layered structure*




administration sector is increasingly reluctant to depend on proprietary solutions for e-gov services and highly support the introduction of open source in public administration.

The introduction of open-source approach can supply above limitations. First, although open-source software is not necessarily free, in most cases is considerably cheaper than proprietary software, giving economic advantages for the public sector.

Second, open-source software, often, adheres to open standards, which means that software development could influence standard and it is conducted in public forums, in contrast to proprietary approach.

Third, in e-gov scenarios, data are exchanged between involved entities and then it is necessary to rely on secure systems to protect the parties against external checking, and/or undesirable release of information to unauthorized users. Security and quality of open-source code, hence, become the major requirements in e-gov environment. Open-source code enables users and other interested parties to check whether the program is written in a secure way and to identify dangerous elements for stability and security of the applications.

Then, open-source paradigm also guarantees supplier independence. A lock-in situation, in fact, arises when software is purchased and depends on when and how the supplier modifies the product. This lock-in problem does not affect open-source software. Data is not stored in a proprietary format, and it is possible for users to change between several different systems and therefore also between several different suppliers.

Finally, customization and re-use are simply addressable because source code is freely available and modifiable; hence, public authorities can adapt open-source software to their particular needs, resulting in lower customization costs.

At this point, we can argue that an important non-functional requirement for e-gov projects could be to implement the entire application following the open-source approach.

However, many ongoing projects do not completely satisfy the above requirement because only the first and third layer, of the structure depicted in Figure 1, are developed following open-source paradigm, while the middleware is, often, a commercial application server, subject to a license and all the limitations that this license implies. For example, the Italian project PEOPLE (http://www.progettopeople.it) is aimed at providing local authorities with a complete set of open-source software components that run on the Linux operating system.

This approach is claimed to provide an open-source e-gov environment; still, experience has shown that in a deployed system a substantial amount of the executable code, including the one implementing important functionalities such as access control, authentication, and so on, usually belongs to a proprietary application server.

In the following is showed how a complete open-source e-gov application can be secured without custom programming. It is firstly presented a solution that relies on open-source middleware functionalities and then a solution to develop a stand alone framework that could be applied to implement authentication services for users that require e-gov services.

## OPEN-SOURCE APPLICATION SERVERS IN E-GOV APPLICATIONS

With the rising of popularity of e-services, there is an increasing need for dynamic, maintainable, secure, and scalable programming platform. The J2EE specification has been introduced to satisfy this requirement. Therefore, an application server based on this standard is able to provide all the needed services to build a modern application. Most e-gov applications heavily rely on middleware that provides several "horizontal" functionalities, that can be used in an e-gov environment to simplify and improve developed applications, such as security, persistence, clustering, transaction, and cache management.

JBoss (JBoss, 2005; Scott, 2003), an open-source fully J2EE compatible application server, is one of the most widely accepted implementation available on the net and represents an interesting solution for e-gov services. One of the most important characteristics of JBoss is its highly modular design.

The adoption of JBoss functionalities to implement a security environment provides clear separation between business components and security modules and does not require any kind of code customization.

In particular, using JBoss features, it is possible to implement a complete and secure access control environment by the configuration of JBoss XML descriptor files and modules only.

Access control is a fundamental part of any e-gov application and must support the definition of restrictions

that establish who is allowed to access applications, control what operations users may perform and protect messages during transit from sending to receiving applications. Current J2EE specifications define a simple role-based security model for Enterprise Java Beans (EJBs) and Web components. The JBoss component framework that handles security is the JBossSX extension framework that provides support for both the role-based declarative J2EE security model as well as integration of custom security through a security proxy layer.

The default implementation of the security model is based on Java Authentication and Authorization Service (JAAS) login modules and subjects. The security model advocated by the J2EE specification is a declarative model. It is declarative in that security roles and permissions are described using a standard XML descriptor rather than embedding security into business components. By configuring the JAAS login modules bundled with JBoss the integration without custom programming can be completed. JAAS includes a set of standard modules for the use of file, database, and lightweight directory access protocol (LDAP)-based security information. Every user is able to write own security modules that fulfill more specific requirements. In the following sections is outlined how security features can be implemented in e-gov applications. In particular, to implement a complete security environment, an access control management could be configured in three main steps:

a. **Configuring a Database Security Domain:** In the common case, our e-gov application takes all needed information for authentication and authorization from a dedicated database, hence tables about username and password, user roles and association between user and role are built and relative components to manage tables are implemented. The introduction of security within an application is done through the definition of its security domain and the customization of JBoss-specific deployment descriptors. Including the following element in *jboss-web.xml* and *jboss.xml*, access control is applied to, respectively, Web application and EJB layer, binding a security manager instance for the application under the security domain named, for instance, by the JNDI name *java:/jaas/MySecurity*. In order to add the chosen database-based login configuration to the application, the *login-config.xml* file must be configured defining the following modules:
   - **dsJndiName:** JNDI name of database containing user and role tables.
   - **principalsQuery:** SQL statement to retrieve the password for a specific user.
   - **rolesQuery:** SQL statement to retrieve the role of the user.
   - **hashAlgorithm:** Selects an hashing algorithm to crypt password (in our case MD5).
   - **hashEncoding:** Selects the encoding algorithm to convert the binary hash value to a string (in our case base64).

b. **Configuring Authentication Process:** After the definition of the Security Domain, the authentication process must be configured. Authentication verifies that a user is who he claims to be. A standard method of configuring the login process for Web application is defined through the specification in Tomcat's *web.xml* file of the URL of login page and login error page. Now, the user can insert login and password that are sent to the login module specified in the ACTION tag.

c. **Configuring Authorization Process:** After a successful authentication process, the user must have the permissions to perform all the operations associated with her role. There are two ways to perform authorization: *programmatic authorization*, the user has to hard-code security checks into bean code, and *declarative authorization*, the container performs all authorization checks, depending on authorization security policies defined in the deployment descriptor.

Traditional e-gov applications use the declarative method through access restriction to EJB or individual EJB methods through *ejb-jar.xml* file or to specific URLs through *web.xml* file, defining which roles are allowed to access them, as shown in Figure 2. In this XML descriptor fragment, we define two roles, *Standard* and *Admin*, with different permissions: role Admin could access all methods of Operator method, but role Standard can only access *getOperator* method. This way, security is entirely managed through JBoss configuration files.

A drawback of declarative approach is how users information and associated roles are built, as they have to be hard coded in a XML file and deployed to a database to create and populate the needed *DatabaseServerLoginModule* tables.

## SINGLE SIGN-ON: A SOLUTION FOR E-GOVERNMENT SECURITY

In the e-gov environment, as previously said, high-sensitive data is exchanged between the involved parties. Hence, an infrastructure that guarantees security, integrity, and confidentiality is needed to avoid external checking and undesirable release of private information. Security of stored data becomes a major requirement of e-gov scenario. In this section, in particular, we analyze and discuss an emergent and widely accepted solution, named single sign-on (SSO), for securing and optimizing user authentication, focused on open-source frameworks.

*Figure 2. Deployment descriptor for users and roles declaration*

```
<ejb-jar>
   ...
   <assembly-descriptor>
      <security-role>
         <description></description>
         <role-name>Standard</role-name>
      </security-role>
      <security-role>
         <description></description>
         <role-name>Admin</role-name>
      </security-role>
      <method-permission>
         <description></description>
         <role-name>Admin</role-name>
         <method>
            <description></description>
            <ejb-name>Operator</ejb-name>
            <method-name>*</method-name>
         </method>
      </method-permission>
      <method-permission >
         <description></description>
         <role-name>Standard</role-name>
         <method>
            <description></description>
            <ejb-name>OperatorSession</ejb-name>
            <method-intf>Remote</method-intf>
            <method-name>getOperator</method-name>
            <method-params></method-params>
         </method>
      </method-permission>
         ...
   </assembly-descriptor>
</ejb-jar>
```

From the account management point of view, traditional approaches required an independent management of accounts in each service domain and the use of different authentication mechanisms. Several usability and security concerns have been raised, leading to a rethinking of the log-on process aimed at coordinating and, where possible, integrating user log-on mechanisms and user account management tools for different service domains.

A service/architecture that provides such coordination and integration is called single sign-on (Galbraith et al., 2002; Single Sign-On, The Open Group, 2005) (see Figure 3).

The advantages given by the introduction of SSO architecture in a pre-existing multi-services intra-domain scenario could be summarized as follows:

- Reduction of (1) time spent by the users during log-on operations to individual domains, (2) failed log-on transactions, (3) time used to log-on to secondary domains, (4) costs and time used for users profiles administrations.
- Improvement to users security. Users have to manage only a couple of username/password.
- Secure and simplified administration. With a centralized administration point, system administrators reduce the time spent to add and remove users to the system or modify their access rights (authorization).
- Improvement of security through the enhanced ability of system administrators to maintain the integrity of users accounts configuration, including the ability to change users access permissions in a coordinated and consistent manner.
- Improvement of services usability. Users have to interact with only one login interface.

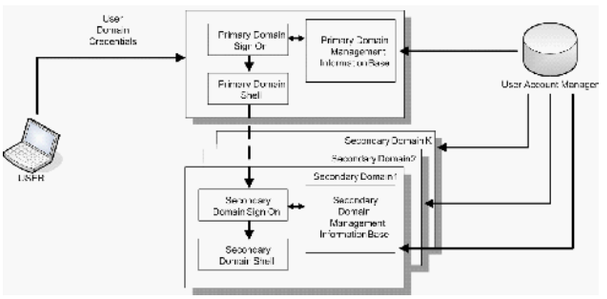
In the SSO approach the primary domain is responsible for collecting and managing all user credentials and information used during the authentication process, both to the primary domain and to each of the secondary domains that the user may potentially require to interact with. This information is then used by SSO services within the primary domain to support the transparent authentication to each of the secondary domains whereby the user actually requests to interact. The information provided by the user to the primary domain can be used in several ways to log-on to a secondary domain:

1. **Directly:** The user information is forwarded to a secondary domain as part of a secondary log-on.
2. **Indirectly:** The user information is used to retrieve other user identification and credentials information, stored within the SSO management information base. The retrieved information is then used for a secondary domain log-on operation.
3. **Immediately:** A session is established with a secondary domain as part of the primary domain session initialization. Client applications are automatically invoked and communications performed at the time of the primary log-on operation.
4. **Temporarily:** Information is stored or cached and used when the secondary domain services are requested.

SSO provides a uniform interface to users accounts management, allowing a coordinated and synchronized management of domains.

The aim of any SSO solution should be to make the login process to multiple sites as secure as giving a username and password to each site. To achieve this goal, different security issues need to be taken into consideration. First, SSO solutions should be based on strong authentication mechanisms; with the traditional password-based mechanism, the theft of a user password could compromise the whole system and also if passwords are not stolen, storing them on a single server makes this server a single point of attack. Therefore,

*Figure 3. User single sign-on to multi-service domain*




for high security environments, a password-based mechanism cannot be sufficient and a certificate-based authentication (e.g., based on X.509 certificates) is preferable.

Another important aspect is related to the security of the server where authentication information (e.g., passwords or certificates) is stored. A robust SSO implementation should ensure the security of that server and the prevention from malicious access to confidential data. Encryption is a viable solution for securing the storage of the users credentials.

A SSO solution should then be designed to guarantee that the key information cannot be determined. For instance, keys could be stored on a smart card or derived each time the user logs on using her password.

Many implementations have been presented to the Internet community as for instance *Central Authentication Service* developed by Yale University, (Aubry, Mathieu, & Marchal, 2004; Central Authentication Service, 2004), *Liberty Alliance project* (Liberty Alliance Project, 2005; Galbraith et al., 2002), a business and technology consortium of more than 130 global organizations that was constituted in 2001, and its SSO implementation *SourceID* (SourceID, 2005), founded in 2001 by Ping Identity Corporation Company, Shibboleth (Shibboleth Project, 2005), an open-source implementation, of Internet2/MACE, *Java Open Single Sign-On* (JOSSO) (Java Open Single Sign-On, 2005), an open-source J2EE-based SSO infrastructure hosted by SourceForge.net and finally *Microsoft Passport* (Microsoft .NET Passport, 2005), one of the most known proprietary Single Sign-On implementation.

## FUTURE TRENDS

For what concerns security issues future enhancements consider techniques that will improve security in case of high sensitive e-gov services. The first solution is the introduction of strong authentication, as said before, because, for high security environments, the traditional username/password authentication mechanism is not enough. Malicious users can steal a password and act in place of the user. New approaches are therefore required to better protect services against unauthorized accesses. A good solution to this problem could integrate username/password with strong authentication mechanisms based on biometric properties of the users (fingerprints, retina scan, and so on).

The second solution concerns mostly the concept of trust and is named Federation. A user should be able to select the services that she wants to federate or de-federate to protect her privacy and to select the services to which she will disclose her own authorization assertions.

For instance, an e-gov portal could offer a set of pre-federated services and list a set of available services that can be dynamically federated or de-federated. Dynamic federation can be useful when different implementations of the same service are available. Again with reference to the portal example, different public organizations can supply a particular service and the user can select the organization she prefers or de-federate the one that she dislikes.

## CONCLUSION

This article presented how to develop and secure open-source e-gov services, arguing that beside the operating system platform and the application code base, also the middleware must be open-source. In particular, JBoss Application Server represents one of the best solutions and provides a complete range of middleware services, including security and clustering management. In particular, this article is focused on providing two principal open-source solutions that allow securing e-gov services: a security implementation that relies on open-source middleware functionalities and one that relies on stand alone framework that provides SSO functionalities. Both of these solutions do not require the insertion of custom code inside business components.

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## KEY TERMS

**Access Control:** A mechanism composed of policies that restrict access to computer resources. It is any mechanism by which a system grants or revokes the right to access some data, or perform some action. Normally, it occurs after user authentication.

**Application Server:** A program (framework) that handles all application operations between users and an organization's backend business applications or databases. Application servers are typically used for complex transaction-based applications. To support high-end needs, an application server must have built-in redundancy, monitors for high-availability, high-performance distributed application services and support for complex database access.

**Authentication:** A process whereby users, computers, or applications present valid information (credentials) to demonstrate their identity that can be verified by the authentication layer.

**Authorization:** A mechanism that determines the requestor access rights that are maintained throughout the session; in particular, rights define who can or cannot execute which action on which resource.

**Federation:** An approach, also for Web applications, which uses standards-based protocols to enable one application to assert the identity of a user to another, thereby, avoiding the need for redundant authentication.

**Service Domain:** The environment within a particular service acts. It includes profile repository, security mechanisms, context and session manager and the service itself.

**Single Sign-On (SSO):** An authentication process in a client/server relationship where the user, or client, can enter her authentication information and have access to more than one application or access to a number of resources within an enterprise. Single sign-on avoids the need for the user to start further authentication processes when switching from one application to another within a multi-service environment.

**Strong Authentication:** A method to improve security against unauthorized accesses, in high sensitive environment, with respect to the traditional username/password authentication mechanism. A good solution could integrate username/password with strong authentication mechanisms based on biometric properties of the user (fingerprints, retina scan, and so on).

**Trust:** An aspect of a relationship between two parties, whereby a given situation is mutually understood and commitments are made toward actions in favour of a desired outcome.

# An Opportunity for E–Democracy in Rebuilding Lower Manhattan

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## INTRODUCTION

Following the events of September 11, 2001 (9-11), the Civic Alliance to Rebuild Downtown New York established a forum for the purposes of gathering citizen opinions on the nature of the rebuilding of New York City's Lower Manhattan area. Citizens gave their opinions on the development of space for a memorial, performing arts spaces, museums, restaurants, hotels, residences and businesses. This effort was named "Listening to the City." Civic Alliance organized two types of citizen opinion-gathering strategies: face-to-face focus groups and online dialog focus groups (www.listeningtothecity.org). The purpose of this article is to assess citizen satisfaction with veness of the online format of citizen involvement in making decisions regarding the rebuilding of Lower Manhattan following the attacks of 9-11. The results contribute to our understanding of the use of Internet technology in gathering citizen opinions in urban development and planning.

## BACKGROUND

In the United States (U.S.), research into digital government and citizen participation conducted in the late 1990s and early 2000s has highlighted the need to re-think the paradigm of citizenship. The three primary changes of traditional paradigm have been: (1) considering the citizen as a customer; (2) understanding the citizen's capacity in participation in public affairs and policy making; and (3) addressing the underlying weaknesses and problems in this form of representation democracy (Holzer, Hu, & Song, 2005). The ultimate goal of digital citizenship has been to develop and maintain new human relationships between the individual (citizen), people (community) and organization (government). The goals of these projects have been to operationalize the process of direct citizen involvement and influence in policy priorities; to enhance government accountability; and to encourage digital citizenship.

The primary case study research in digital democracy has been centered on Minnesota State Government Department; City of Santa Monica; California Governor's Office; City of Virginia Beach; Winston-Salem, North Carolina; and Prince William County, Virginia. In these cases, citizens have been asked to present their perceptions and concerns through surveys and other feedback mechanisms to gain their participation and to empower citizens to set priorities. Each of these government entities has demonstrated its desire to have enhanced government accountability by publishing Accountability Reports on the Internet and the California Scorecard. These entities also realized the need to address the underlying weaknesses and problems of representative democracy by providing convenient platforms for the public to access and respond to public issues.

Urban planning incorporates regulation as well as social/political and economic inclusion, which has costs as well as benefits (Hoffmann, 2003). Civic involvement in planning is critical and involves an exchange between government and the community, giving the community control while disciplining and stabilizing the planning process. The outcome of participative planning is community pride and collaboration, important civic values (Johnson & Ward, 1972). Planning, particularly in urban areas, has become market driven, since many of these areas are under-serviced and under-retailed (Porter, 1995).

Organizations have effectively harnessed Internet technology to streamline their communications inside and outside the organization. The concept of "community" has been redefined by the Internet through chat rooms and discussion group technology, where citizens can take active roles in real time (synchronous) or respond at their convenience 24 hours per day, 7 days per week (24/7) in an asynchronous format.

By 2000, more than 54 million US households had one or more computers (US Census Bureau, 2001). In households where income was $75,000 or higher, 88% had one or more computers, and Internet usage in households of more than $75,000 was 79%. Single persons were the least likely to have a computer and Internet access. In metropolitan areas, such as New York City, 46% of households had computers and 38% had Internet access (U.S Census Bureau, 2001).

However, online information gathering often tends to result in collecting data from the wealthier, more educated "information rich" as opposed to the entire population (Kakabadse, Kadabadse, & Kouzmin, 2003). Therefore, before accepting online information gathering as a panacea for citizen involve-

ment, one must be aware of the risk that not all voices may be heard. Random sampling may also be problematic, since such a sample will be limited to those citizens who have a home computer, high-speed Internet access and are computer savvy; (Palmquist & Stueve, 1996) and often, are female users (Barry, 2000).

In addition to the advantages of ease, speed and efficiency, online gathering of citizen opinions features the ability to easily provide searchable background material and references on the topics being discussed. This feature allows a citizen who may not be an "expert" on the topic at hand to become knowledgeable. The use of online resources in the form of newsletters and references can easily facilitate becoming knowledgeable on a topic in a short period of time (Bouras, Katris, & Triantafillou, 2003).

The methods by which communities can be involved in urban planning and development have been influenced by the rapid expansion of the Internet. Participation in an online forum is a function of motivation, ease of communication and the social economic status of the individual (Wang & Fesenmaier, 2003). Individuals are motivated to participate when they perceive that they can contribute actively and freely, and provide unique information. They may also have their needs for affiliation and power satisfied. The feeling that one can contribute to and have an impact on the group motivates participation in the group.

A mediating factor in an individual's motivation and ability to participate in an online community exchange is its ease of use, as well as the level of that person's computer efficacy. Computer efficacy can be described as an individual's perception of his or her ability to use the computer.

A particular personality— for example, active, efficacious or generous— will contribute to participation in the online community. According to Wang and Fesenmaier (2003), people who participate in such activities are more likely to be expressive, sensing-judging, high in self esteem, high in competence, high in internal locus of control, low in need for approval and high in moral development. In addition, participation is also a function of a person's involvement in his or her community.

In 1995, there were only 5 Web sites; by the number of Web sites increased. This dramatic development of the

The purpose of this research was to examine citizens' opinions on the use of online technology to facilitate their input on the rebuilding of New York City's Lower Manhattan area following the terrorist attacks of 9/11.

## METHODOLOGY

During the summer of 2002, AmericaSpeaks convened a series of large-scale public participation forums entitled "The 21st Century Town Meeting" following the 9/11 attacks. Working with leaders, citizens and media organizations, AmericaSpeaks coordinated two face-to-face citizen groups at the Javits Center July 20 and 22. AmericaSpeaks also recruited Web Lab, a non-profit group dedicated to developing the use of the Internet, to explore public issues by convening 26 online dialog groups between July 29 and August 12. Over that 2-week period, citizens participated in online discussion groups. In these dialogs, 818 people working simultaneously in 26 small discussion groups (30 people per group) participated in the exchange of ideas and reviewed proposals and debated policy issues. Thirteen groups were assigned a facilitator; the remaining groups were unfacilitated. The groups responded to six concept plans presented for the rebuilding of the World Trade Center site and the surrounding area. Each plan consisted of memorial space, open spaces, areas for housing cultural institutions, a hotel, 11 million square feet of office space and a new transportation center. Not only did the citizens exchange more than 10,000 messages, but they also participated in 32 opinion polls on various topics that emerged during that period of online discussion.

Using small group discussion (SGD) software, citizens were assigned by computer to groups based on their demographic characteristics to assure diversity within each group. Unlike traditional online discussion boards, SGD software (1) assigns participants to multiple small groups, rather than creating a crowded, anonymous mass; (2) uses group member "bios" and introductions to promote intimacy and dramatically reduce "flaming"; and (3) sets a limited lifespan for each group, promoting commitment and providing closure. SGD software was developed by Web Lab to use the power of the Internet as a positive, transformative force in society at large (www.weblab.org/home.html).

Following the online dialog sessions, all 550 people who participated received an electronically distributed online survey to gather their opinions on the effectiveness and efficiency of the online dialog process. The survey was comprised of 50 objective questions, 13 demographic questions and 6 open-ended questions in the following categories: (1) computer usage and political action activities; (2) dialog sessions content and group facilitation; (3) number and content of messages posted by other participants; and (4) ability to post messages.

## RESULTS

Two hundred and forty-four individuals responded to the follow-up survey (Table 1). The majority of the respondents (54.7%) indicated that they were between the ages of 35 and 54. The gender of the respondents was evenly divided between females (51.7%) and males (48.3%). Although minority groups were represented, an overwhelming 81.9% of respondents were Caucasian. Seventy-seven percent of the respondents possessed college or postgraduate degrees. Income levels appeared to be equally distributed between the range of $25,000 to $100,000. However, 32.3% indicated an income of more than $100,000 and 9.1% indicated incomes of less than $25,000.

The respondent group was comprised of very active computer users, with 63.5% indicating that they typically spend more than 4 hours on the computer each day. Seventy-seven percent stated that they went online several times per day, primarily to respond to e-mail. Interestingly, 38.8% indicated that they were not frequent users of online chats and discussion rooms. However, 65.9% indicated that they used the Internet for research at least once per day or more. A majority (78.6%) indicated that they used the Internet to obtain news, and 72.0% purchased goods and services online at least once every few weeks.

A large majority (91.1%) of respondents indicated that they had voted in elections in the past 2 years. Approximately 59% had made financial contributions online; however, only 30.8% had contributed money to a political campaign and 56.1% had attended a public meeting or demonstration. Approximately 74% of the respondents said they had contacted an elected official by phone or e-mail. Only 18.1% said they had volunteered or worked on a political campaign in the last 2 years.

There was general agreement that having a facilitator was helpful to the online dialog process. Facilitators provided guidance and a helping hand to the online dialog process. Individuals in the non-facilitated groups indicated that they enjoyed and benefited from self-facilitation; however, a large percentage (41.0%) stated that though their group was able to self-facilitate, they would have preferred to have had a facilitator. An overwhelming majority (69.2%) of participants from both types of groups stated a preference for inclusion in a facilitated group in the future, but not surprisingly, more respondents from facilitated groups (82.0%) indicated this preference when compared to those from non-facilitated groups (50.0%).

Fifty percent (50%) of respondents agreed with the length of the dialog. Approximately 67% of respondents said that their views and feelings were affected by participating in the online dialog. A majority (53.5%) indicated that their respect for individuals within their group had increased somewhat or a lot, and that they cared about the group dynamics in their dialog group.

When respondents from facilitated groups were asked how effectively facilitators dealt with group members who acted inappropriately, only 34.3% indicated that they were very effective. A majority of respondents (81.4%) said that all or most participants listened to other participants. This was more pronounced in the non-facilitated groups (46% = almost all) than in the facilitated groups (33% = almost all). Ironically, 57.3% of respondents reported that people tried to dominate in facilitated groups, whereas 48.3% stated that people tried to dominate discussions in non-facilitated groups. In both the facilitated and non-facilitated group, 17.1% of the respondents stated that individuals dropped out of online dialog groups due to insults. This was more likely to occur in facilitated groups (23.1%) than in non-facilitated groups (14.2%).

During the online dialog, participants had the opportunity to respond to online polls on a variety of topics related to the rebuilding of the World Trade Center site and use of online technology. Regarding the rebuilding process, participants voted on the importance of the following topics: hopes and concerns about the rebuilding process; adding a major element to the New York City skyline; whether a new tower should be built and how high the tower should be; how the open spaces should be used; having a unique, mixed-use space; developing a transportation hub (Grand Central of Lower Manhattan); having housing on or adjacent to the World Trade Center site; the importance of multiple income levels and diversity in housing provided; deciding who should participate in the decision-making process; and dedicating the memorial to certain groups. Participants also responded to online polls on how confident they felt that their opinions would be heard; how satisfied they were with the online dialog; where they accessed the online dialogs; and other related topics.

As part of the online dialog, participants had the opportunity to read messages posted electronically at their convenience. Approximately 67% of the respondents reported that they read more than three-quarters of the group messages. Major reasons stated for not reading messages included being too busy (63.0% = some to a lot of impact) and having too many messages (58.7% = some to a lot of impact). Group members reportedly pushed their views more excessively in facilitated groups (51.3%) as opposed to the non-facilitated groups (37.8%). However, the impact of insensitive or abusive members appeared to be less pronounced in the facilitated groups

*Table 1. Demographic characteristics of survey respondents*

| **Characteristics (n = 244)** | **Respondents (number)** | **Respondents (percentage)** |
|---|---|---|
| **Gender** (n = 232) | | |
| Male | 112 | 48.3 |
| Female | 120 | 51.7 |
| **Age** (n = 232) | | |
| 14-19 | 3 | 1.3 |
| 20-34 | 70 | 30.2 |
| 35-54 | 127 | 54.7 |
| 55-64 | 27 | 11.6 |
| 65 and over | 5 | 2.2 |
| **Race** (n = 232) | | |
| Caucasian | 190 | 81.9 |
| Hispanic | 12 | 5.2 |
| African-American | 11 | 4.7 |
| Asian-Pacific Islander | 9 | 3.9 |
| Other | 10 | 4.3 |
| **Income** (n = 232) | | |
| Less than $25,000 | 21 | 9.1 |
| $25,000 - $49,999 | 44 | 19.0 |
| $50,000 - $74,999 | 47 | 20.3 |
| $75,000 - $100,000 | 45 | 19.4 |
| More than $100,00 | 75 | 32.3 |
| **Education** (n = 212) | | |
| Advanced Graduate Degree | 85 | 40.1 |
| Bachelor Degree | 79 | 37.3 |
| Associate Degree | 9 | 4.2 |
| Some College | 26 | 12.2 |
| High School Degree | 5 | 2.4 |
| Some High School | 3 | 1.4 |
| Grade School | 5 | 2.4 |

(51.3% = no impact) when compared with the non-facilitated groups (44.3% = no impact). It appeared that difficulties with using the online process were not a major factor limiting the reading activities of members, with 55.1% reporting no problems with the use of the site.

Participants in the online process were asked about their experiences with posting messages. Respondents reported that the time they spent posting messages ranged from less than15 minutes to more than 2 hours, with no significant difference between facilitated and non-facilitated group members.

## FUTURE TRENDS

A review of the demographic characteristics of the participants in the use of online dialog technology reveals that they are a very select group of citizens. A comparison with data from the 2000 US Census survey on computer usage in US households suggests that these participants represent a small segment of metropolitan households that have a computer with an Internet connection. Citizens who participated in this project tended to be highly educated, with one or more college degrees; and wealthy, with a majority reporting an annual income of $75,000 or more per year. Additionally, they tended to be frequent and regular users of Internet, and politically active. They do not represent the population at large. Therefore, if this method where used again, without modification, the results would be skewed, resulting in hearing the voices of the wealthy citizenry to the exclusion of the average citizen.

In general, the respondents enjoyed participating in the process and preferred being in a facilitated group as opposed to a non-facilitated group. It became clear that facilitators helped the groups stay focused on the topic at hand and controlled respondents who may have tried to dominate a group or who insulted others with their comments. Even though respondents in some of the non-facilitated groups indicated that they had a very positive group experience, they were not in the majority. Therefore, the need for a facilitator would probably result in less conflict and more active participation in all online groups. The facilitator should have more extensive training, which would include group dynamics and conflict resolution. The facilitator should set guidelines at the beginning of the process. Many respondents felt the guidelines were not clear and, therefore, were not easily enforceable by the facilitator. One alternative would be to allow the group to set guidelines, rules and consequences for participation in the online group process. The facilitator should have clear guidelines and prior training before coordinating online groups.

Based on the nature of the responses, citizens seemed to feel that the purpose of the process was to give their opinions and to have their voices heard (the citizen model) as opposed to just trying to get their trust, confidence and acceptance of pre-existing plans (the administrative model). To reinforce the importance of hearing the voices of citizens, in the initial orientation to the online group process, it is important to let the respondents know the outcome of their participation in this process. This would be communicated by answering the questions: *What happens with the results of the online dialog? Who will use it? How will it be used?* Answering these questions early in the process may increase the dedication and commitment of respondents to the process. For this project, however, these questions were not answered for the citizen respondents.

Many respondents thought the background materials, including newsletters, documents and maps, were helpful. This approach to transparency of information was also supported by Bouras, Katris, and Triantafillou (2003) in their study of electronic polling to support public awareness. This process allows those people who are not experts on the topic to become better informed. Respondents' views and feelings were affected by participating in the online dialog in that they were able to communicate with other people in a convenient format and with people from other socioeconomic backgrounds. This process became an educational one in addition to providing an avenue for the voices of citizens to be heard. In the process of posting, respondents were able to think out their response, reflect and process it more clearly than in a face-to-face discussion. They also had the opportunity to "hear" each and every person's ideas, since the dialog was available for reading online 24/7. There appeared to be a consensus that it was not possible to read all of the postings due to the volume, the length of postings and the time frame for the online dialog. There were a few technical problems responding to polls, and one person mentioned that the 56K modem was not ideal for this process. Based on this comment, a clear outline of guidelines for appropriate computer hardware and software might prevent or resolve the few technical problems in future projects.

## RECOMMENDATIONS

Online computer technology has many positive attributes that facilitate gathering the opinions of citizens on urban development in that it is inexpensive, quick and easy. However, because of the cost and availability of this technology, it does not effectively get opinions of all segments of the population. It is not just the use of technology in question here, but the ability to have the free time to spend contributing to the community, as opposed to working to support families, especially those with young children. Based on this research, the following are recommendations for the use of online technology to gather citizen opinions regarding community issues regarding urban development:

- Involve citizens early in the urban planning and development process to be able to incorporate their opinions and gain acceptance

- Provide educational material to inform citizens about the nature of the planning and development
- Promote involvement of new actors and development of public private partnerships to contribute in urban planning
- Obtain a more representative sample with regard to ethnicity, education, income level and geography
- Provide training for facilitators and back-up support during the online process
- Fully inform respondents as to how the results of the online dialog will be used to contribute to the process/ problem being considered
- Include a question about respondents' experience with previous online dialogs to determine the skill and expertise of the group.

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## KEY TERMS

**Administrative Model of Citizen Involvement:** Citizens are involved in the planning process of a public project for the purposes of gaining their trust and confidence in the project and, in addition, gaining their acceptance of decisions that are made (Seifert, 2003).

**Citizen Model of Citizen Involvement:** Provides citizens a voice in planning and decision making for the purposes of improving the plans and decisions made (Seifert, 2003).

**Digital Government:** A transformative force affecting all levels and functions of government wherein the relationship between the citizens, community and government is being digitized.

**Flaming:** Personal attacks and insults that may occur in group interactions to members or moderators of groups.

**"Listening to the City":** A focus group opportunity following the attacks of 9-11 in Manhattan, N.Y., giving people a chance to contribute their opinions and ideas regarding redevelopment of Lower Manhattan and the creation of a permanent memorial to the victims of 9/11.

**Small Group Discussion (SDG) Software:** (1) Assigns participants to multiple small groups; (2) uses group member "bios" and introductions to promote intimacy and dramatically reduce "flaming"; and 3) sets a limited lifespan for each group, promoting commitment and providing closure. (developed by Web Lab, *www.weblab.org/home.html*).

**The Civic Alliance:** A New York City organization composed of 85 businesses, environmental, community, university and labor groups committed to fostering the involvement of citizens in the rebuilding process.

**Urban Planning:** The area of architecture that relates to design and organization of urban spaces.

# Parliament and E-Governance in Finland



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## INTRODUCTION

The Standing Committee for the Future in the Finnish Parliament has a motto: *It is the duty of parliament to observe the changing world, analyse it, and take a view in good time on how Finnish society and its political actors should respond to the challenges of the future. Democracy cannot be realised simply by accepting changes that have already taken place.* Indeed, parliaments have a role in e-governance all over the world, and this role will be discussed briefly in this article with a reference to the case of the Parliament of Finland.

## BACKGROUND

Why are parliaments important? The information society and e-governance are on agendas all over the world. Every nation tries to jump into the knowledge-based society as quickly and as deeply as possible.

In November 2004, the World Bank organised a seminar on "e-Governance: From Successful Pilot to Sustainable Implementation" in India (Bangalore). One hot topic, especially in the debate in the press, was the effectiveness of this new and promising development aid called e-governance. Evaluation of development aid is not easy, but it seems that e-government initiatives in developing and transitional countries have not been particularly successful. It has even been calculated that 35% are total failures, 50% are partial failures, and only 15% are successes. There is no actual evidence that e-government failure rates in developing countries should be any lower than those in industrialised countries. But there are plenty of practical reasons to support the idea that e-government failure rates in those countries might be much higher.

One basic mistake has been that politicians, as decision makers and opinion leaders, have not been really committed to e-governance. For them, it has been just one issue of technology among others in line, not really their business at all. Still, e-governance, as with any other part of governance (Tiihonen, 2004), is not a task for experts—it is a matter of common interest, together building a better future for people.

What kinds of models concerning building e-government or e-governance, are in the world for the active use of politicians? Not many, but Finland—and, in this case especially, the Committee for the Future in the Finnish Parliament—offers one of these. The role of parliaments is the same all over the world: to reactively handle proposals for legislation and annual budgets given by governments. But, can a parliament be a forerunner and an active player for a new society? Yes. This can happen in Finland, where, in 1906, women were the first in the world to get full voting and candidature rights, which can be an explanation for why, after 100 years of this kind of great social innovation, the same Finnish Parliament was the first country in the world to decide that our common future is so important that politicians also have to take real responsibility for it.

The Committee for the Future was established at the beginning of the 1990s and functioned on a temporary basis from 1993 until 2000. Then, on December 17, 1999, in conjunction with adoption of the new constitution, Parliament decided to grant the Committee for the Future permanent status (http://www.parliament.fi/FutureCommittee).

The Committee for the Future in the Finnish Parliament has the same status as the other standing committees. Each of the standing committees has its corresponding ministry, and in the case of the Committee for the Future this is the Prime Minister's Office. From the very beginning, all 17 members of the Committee have been parliamentarians. Its current tasks are defined to be I) to prepare material to be submitted to the Finnish parliament, such as government reports on the future, II) to make submissions on future-related long-term issues to other standing committees, III) to debate issues relating to future development factors and development models, IV) to undertake analyses pertaining to future-related research and IT methodology, and V) to function as a parliamentary body for assessing technological development and its consequences for society (Arter, 2000).

## POLITICS: FOR OR AGAINST NEW TECHNOLOGY, NEW THINGS?

Politics in this context is about values, attitudes, atmosphere and opinion building, and, not forgetting the most important, opinion leading. Normally, politics is against new technology and generally against change. It is said

that voters do not always want all these new things. But in the Finnish case, the case is just the opposite, which is why politics is needed—to support new ideas, and, among them, new innovations and new technology (Tiitinen, 2004).

For the past fifteen years, we experts have told that in the New World—at least in the New Economy based on Information and ICT, on Knowledge and Wisdom—the role of the state and parliament no longer holds importance. Governmental tasks will be minimised, if not diminished all together. But again, the Finnish case has proven something else. On the contrary, the role of the governments in the new e-world or u-world is changing, but it is certainly not getting smaller. Without active participation by governments and parliaments, really useful, effective and economically valuable e-services—public and private—will never succeed. The state's role is to provide an enabling environment for the new development and support new initiatives for efficient economy and competitiveness. The state—in practice parliaments—have to take care of "fare play" among different players in the information society. In Finland, Parliament has to make sure that citizens have equal possibilities also in the e-governance.

In Finland, Parliament has taken an active role. Some examples: the state has for 50 years been responsible for equal school and education possibilities for all citizens which means free of charge education system from bottom up. The level of education, the strong input in polytechnics and engineering, have later supported the telecommunications R&D development. In the period of the last depression (at the beginning of the 1990s) the public policy incentive was to strongly increase R&D funding from public resources, which was just the opposite policy than in most countries. Today, the private sector is the major financier of R&D. The technology policy and the national strategy to build Finland as one of the leading information societies have enhanced the use of ICT, both in public administration, private business and every walk of life in society (Klus & Kalscheuer, 1997).

In general, and also in the knowledge economy, good governance without corruption plays an invaluable role. Institutions, both administrative and political, really do matter, even if we think that we are moving from governing to governance (Tiihonen, 2004). It is a fundamental task of parliaments to make sure that there are reliable, well-functioning and innovative governments, ministries, and other basic public institutions.

Here is one more example from Parliament. In 1997 the Committee for the Future was given a second official principal task, that of assessing the effects of technology on society. The following reasons were named as evidence that a need for assessment work existed:

*The argument that there is a need for technology assessment in the Parliament can be justified in two ways. The accelerating development of science and technology is having substantial effects on society, economic development and the life of the individual. Technology assessment helps parliamentarians understand these influences better and take them into account in political decision making. The other justifying factor relates to Parliament's tasks and democracy. When legislative and budgetary proposals of significant importance for society are submitted for its consideration, Parliament must, if it is to be able to exercise oversight of the Government's actions, already have a good enough foundation of knowledge on which to assess these proposals.*

Technology assessment linked in one way or another to parliamentary work has proved itself to be a successful solution in several European countries. What is meant by technology assessment in a parliamentary context is appraisal of the effects on society of using the results of scientific research and technology. The questions and needs stipulated by the parliament provide the point of departure. Technology assessment generally encompasses broader sectors of science and technology, such as biotechnology, mass communications, transport, energy, and so forth. From the very beginning, the Committee for the Future has examined technology and such phenomena of change in the structure of our society as globalisation, innovation, and governance as a development feature permeating the whole of Finnish society.

However, in Finland, one centrally important deviation from other parliaments was made right at the beginning. No unit independent of Parliament has assumed responsibility for technology assessment, as has been done in Germany, for instance; instead, the task is performed by the committee itself so the 17 Members of the Parliament sitting twice a week 2-3 hours in meetings. To support its work, the committee can commission studies from various research institutes or think tanks.

Some examples. It was 5 years ago that Parliament of Finland, while analysing Finland's future prospects, highlighted innovation, with special emphasis on its human aspects. With this respect to these challenges and opportunities the Committee decided to write a report on knowledge management at the level of politics and policy making (Suurla, Markkula, & Mustajärvi, 2002).

The subject of one of the most recent technology assessments was the Finnish knowledge society model—more specifically, its sustainability in its second phase (Himanen, 2004) The person invited to do the background research was Dr. Pekka Himanen of the University of California at Berkeley where Manuel Castells is a profes-

sor. Castells visited Finland and took part in discussions of the Committee. The Committee as a whole acted as the steering group for the work and deliberated the researcher's results in its meetings, and visited a common seminar in Berkeley, California, and so forth. The committee also used the results as an aid to prepare the presentation it gave as the basis for discussion at a plenary session. This report and its deliberation in Parliament attracted an exceptional amount of public attention. Altogether, the system of working together for the better information society—the dialogue between Parliament and the Government—was successful.

## FUTURE TRENDS

The Finnish case is an example how important it is that power centres of politics are involved and really committed to build the information society. There are a lot of signs and weak signals that e-governance, in order to make a difference, needs more and more support from decision makers. The review of the Committee for the Future called Challenges of the Global Information Society (Himanen, 2004) came to the conclusion that the most critical aspect in the development of the information society is the development of the deep-set structure of society. These elements must explain why so many countries try to copy the Finnish model.

## CONCLUSION

The Finnish model is unique. Perhaps it is too early to say anything about real success. One thing, however, is certain: the committee has taken its place in the Finnish parliamentary system as an innovative political body. First, it is an adage of political life at any level that the first step to power is to take the initiative and put yourself in a position where you can set the agenda. In the Finnish Parliament, the Committee for the Future has taken this adage seriously. It has created a new forum that works at the inner circles of the parliamentary system and—even more important—it has demonstrated that parliamentary measures can still be used to take the initiative within democracy.

Second, it is an excellent vantage point when the main task is dialogue with the Prime Minister's Office and government on future-related issues. The Committee for the Future is a good forum where parliamentarians can broaden their views beyond everyday politics and their own country's problems. The committee's work has become quite international in character. Quite a large proportion of the ministers in the present cabinet are former members of the Committee. They include the prime minister and the ministers of finance, labour, and the environment. Two important party leaders are members of the Committee. The present chairman of the committee, MP Jyrki Katainen, was chosen as the leader of the biggest opposition party (The National Coalition Party) in the summer of 2004, one year after the elections. He appreciates and enjoys his work on the Committee for the Future so much that he has continued to chair it.

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## KEY TERMS

**Commitment:** Interaction dominated by obligations.

**Democracy:** Rule by the people.

**E-Governance:** A broader and more future oriented governing system of information society than e-government, which is the use of information technology in the internal processes of government and the delivery of government products and services to citizens and industry.

**Parliament:** A legislature.

**Policy Making:** A course of action adopted and pursued by a government, party, ruler or statesman.

**Power:** Possession of control or command over others.

**State:** An organized political community occupying a definite territory, having an organized government, and possessing internal and external sovereignty.

# Participatory Geographic Information Science

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## INTRODUCTION

A majority of governmental problems are geographical in character and are becoming more complex as citizens/residents expect more for less. Governance, among many things, involves allocating human, natural, monetary, and infrastructure resources within and across jurisdictional boundaries in an efficient, effective, and equitable manner. Such allocations are becoming increasingly more challenging under budget constraints. Many public policy problems are called "wicked" and "ill-structured" (Rittel & Webber, 1973) because they contain intangibles not easily quantified and modelled. The scoping of such problems includes structures only partially known or burdened by uncertainties, and potential solutions mired by competing interests. Examples of such problems in a geographic domain include locally unwanted land uses (LULUs) such as landfill and hazardous waste facility siting, and more recently, polluted urban land use (so-called brownfield) redevelopment projects called into question due to the potential for increasing neighbourhood contamination. Dealing with locational conflict in an open manner is becoming more important as citizen-stakeholder participation increases in public policy/problem circumstances (Crowfoot & Wondolleck 1990).

## BACKGROUND

The primary rationale for enhanced stakeholder participation in public land and resource planning is based on the democratic maxim that those affected by a decision should participate directly in the decision-making process (Smith, 1982). Poole (1985) provides motivation for research on group decision making by saying "we [should] focus on groups because they are basic (many social theorists have called the small-group the building block of society), because they are important (many consequential decisions in government and business are made by groups), and because they are interesting (group behaviour is considerably more complex than the dyadic case). ... [Although] decision-making represents only a small portion of group behaviour, it is perhaps the most important behaviour groups undertake. As well as being significant in its own right, decision making sets the course for other group activities" (p. 206).

To add to that, Zey (1992) states "that decisions [in society] are most frequently made by groups within the context of larger social collectives" (p. 22). Following up in the same book on decision making, Simon, Dantzig, Hogarth, Piott, Raiffa, Schelling, et al. (1992) conclude that "the resolution of conflicts of values (individual and group) and of inconsistencies in belief will continue to be highly productive directions of inquiry, addressed to issues of great importance to society" (p. 53). Events across the world show that the motivation is stronger now that ever before.

Over the past 3 decades, geographic (geospatial) information systems (GIS) have been developed and used to address geospatial problems of all kinds, including some of those described above. GIS has for a long time been touted as a type of *decision support system* (Cowen, 1988). In the late 1980s researchers started to recognize that a conceptual foundation was needed for continuing the maturation of GIS, which emerged as a field called geographic information science (GIScience; Longley, Goodchild, Maguire, & Rhind, 2001). For the most part, GIS grew as a single-user technology; that is, a technology that considered a single-user (group and/or organization) perspective only, even when dealing with many complex decision problems described earlier. Based on research about groups (McGrath, 1984) and group decision support (DeSanctis & Gallupe, 1987), in the early 1990s, GIS researchers began to recognize the shortcomings of a single-user perspective in the GIS technology and started to explore the use of GIS for addressing group-based, wicked, ill-structured, public issues (Armstrong, 1993). That technology is now referred to as participatory GIS (Harris, Weiner, Warner, & Levin, 1995) or public participation GIS (Nyerges, Barndt, & Brooks, 1997). Many researchers realized that the single-user GIS technology was inadequate to the task—although the technology is still used in many places. Consequently, Participatory GIScience, as a subfield of GIScience, is emerging as an area of study that provides systematic, *conceptual foundations* for development and use of Participatory GIS (PGISystem) technology including data, software, hardware and group process (Jankowski & Nyerges, 2001). A recent review of PGISystems appears elsewhere (Rinner, 2003).

## A FOUNDATION FOR PGISystem-BASED DECISION SUPPORT

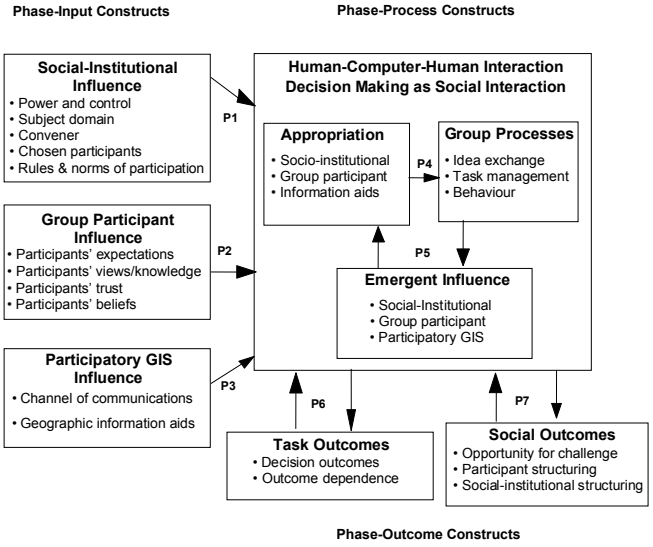
A major concern within PGIScience is bridging a gap between theory and application of PGISystems, as sound frameworks can lead to more robust as well as flexible technologies that can address some of the complex geospatial decision support problems described earlier. Information needs and the associated decision support tool requirements can be addressed by a good understanding of the decision situation at the time and place (context) within which it occurs. As an example, we can offer the six-phase landscape modeling process elucidated by Steinitz (1990), used as a framework agenda in several large landscape planning projects across the world. That six-phase process involves: (1) database representation modeling, (2) land development process modeling, (3) scenario evaluation modeling, (4) change of landscape modeling, (5) impact on landscape modeling, and (6) decision evaluation modelling. Each model description feeds to the next phase, but the entire process is iterative to "catch" aspects overlooked. The flow of information in participatory decision processes can be addressed by a two-level description of process, what we call a macro–micro strategy (Jankowski & Nyerges, 2001). To use a macro-micro strategy for characterizing participatory decision situations imagine a matrix comprised of six columns representing the macrophases defined by the Steinitz's six-phase process, and four rows representing microactivities: (1) gather, (2) organize, (3) select, (4) review. Those microactivities derive from Simon's (1979) work on management decision making. For any given decision task, Simon found that people perform some amount of intelligence gathering, design a problem structure, select a choice of options among the design, and review their work before proceeding. Consequently, the six macrophases together with four microactivities constitute 24 "phase-activity" steps of the particular version of the macro-macro framework, at least in terms of a systematic articulation of what Steinitz (1990) outlined.

The significance of "phase-activity" labeling is that a *phase* speaks to the issue of what is expected as an outcome in the overall strategy, while an *activity* is an action (i.e., use of a GIS tool) that fosters creation of the outcome. Thus, the attractiveness of the macro-micro approach is that a group could use any GIS-supported project agenda (plan) to articulate macrophases, while asking themselves what information tools are needed to support the microactivity processing. The macro-micro strategy for analysing decision situations is a normative description of an expected decision process. Of course, decision processes are not likely to proceed in a rational way, mostly because people's judgments often depart from normative rationality (Kahneman, 1974). However, if a group (or multiple groups) was (were) dealing with rather complicated geographic decision situations like transportation improvement or hazardous waste cleanup, such a process could be used as an agenda to outline an analytic-deliberative decision process as a recommended way to proceed (National Research Council, 1996). Whether groups follow their own project/meeting agendas is up to them. Balanced agenda plans are more often useful than not, as a balanced discourse agenda fosters communicative rationality in building a shared understanding about discourse within an analytic-deliberative process (Habermas, 1984).

Keeping the "actual" versus "normative" view in mind, it is important to understand how people undertake decision making while making use of geographic information technologies. That understanding, particularly if developed in a systematic way through social science research, provides an important contribution to PGIScience. In order to provide a more in-depth articulation of what can transpire during a participatory decision-making process involving the use of PGISystems and other decision support technologies, Nyerges and Jankowski (1997) developed Enhanced Adaptive Structuration Theory (EAST), which is now in a second version as EAST2 (Jankowski & Nyerges, 2001). EAST2 is a network of constructs and their relationships providing a theoretical framework to organise and subsequently help explain *each macrophase* of a participatory decision process. That means that EAST2 as a framework is re-applied to each of the six modeling phases in the Steinitz (1990) landscape planning process. Applying the framework is a way of easily unpacking complexity by articulating each macrophase in terms of the most salient aspects of the phase. Thus, when more aspects change as a process moves forward from phase to phase, we can say that a decision situation becomes more complex. As such, EAST2 has both a research and a practical value. From the research perspective, EAST2 helps to explain the expected and observed realizations of participatory decision processes involving inter- and intraorganizational groups and human-computer-human interaction. From the practical/application perspective EAST2 helps set up group decision support systems for specific decision situations. But how can a theoretical framework comprised of constructs and their relationships effectively contribute to building PGISystems?

EAST2 provides the basis for developing PGISystems and selecting tools appropriate for a given task due to its comprehensive character. In Figure 1, the EAST2 framework consists of a set of eight constructs, with 25 *aspects* as the basic elements (bulleted items) of the theory that outline significant issues for characterising group decision making, and a set of seven premises (the P's) that describe the *relations* between the eight constructs (hence the aspects contained within those constructs). The 25 aspects in different combinations for each premise can "map" different relationships, which may occur during a group decision-making process that involves human-computer-human interactions. The aspects in conjunction with the premises, allow us not only to formulate research hypotheses about the use of PGISystems and its likely outcomes but also help us assess which methods and decision support tools will likely address decision support needs.

*Figure 1. Enhanced adaptive structuration theory 2 (EAST2) framework for unpacking complex decision situations in the context of PGISystems use*




## APPYLING THE EAST2 FRAMEWORK IN A DECISION SITUATION ASSESSMENT

Over the past several years, EAST2 has evolved into a mechanism through which decision analysts can perform complex decision situation assessments. Performing a decision situation assessment is a way to grapple with the how information technology can support complex decision problems. Using EAST2, decision situation assessments have been performed in a variety of application contexts (e.g., public health services, transportation, habitat redevelopment, hazardous waste cleanup, water resource planning, and earthquake-induced landslide decision support). Through such applications we have found that four levels of decision situation assessment are possible. From a general approach to a detailed approach they are: (1) situation overview, (2) situation phases, (3) situation phase-constructs, and (4) situation phase-construct-aspects. Each of those approaches described below starts out with a question that focuses the nature of the assessment.

### Situation Overview

Has PGISystem been useful / is PGISystem useful / or can PGISystem be useful at all, as articulated within a general description of the situation in terms of convening (input), process, and outcome concerns associated with geospatial information use? An overview assessment provides us with the "laugh test". That is, if a PGISystem has been used or is being considered for use, there are certain core issues, that once addressed, should help avoid the circumstance of someone "laughing out loud and saying—you used a PGISystem to do what?" In many respects we can actually differentiate among planning, capital improvement programming, and project implementation-level decision situations. There are three main concerns within a decision situation overview about PGISystem use. First, what are the concerns about convening a decision situation? Second, what are the concerns about the process involved in a decision situation? Third, what are the concerns about the outcomes of a decision situation?

### Situation Phases

Has PGISystem been useful / is PGISystem useful / or can it be useful, as articulated within a phase-to-phase description of convening (input), process, and outcome concerns associated with geospatial information use? The decision situation assessment framework draws together numerous results from theoretical and applied research about the development and evaluation of participatory decision processes, many of which made use of geographic information systems due to their complexity. A general form of an analytic-deliberative (A-D) decision process is described in a National Research Council (1996) report entitled *Understanding Risk: Informing Decisions in a Democratic Society*. That process, was investigated in more detail as three phases by Renn, Webler, Rakel, Dienel, and Johnson (1993) and Renn, Blattel-Mink, and Kastenholz (1997), and has been shown to work rather well in complex environmental decision situations.

- Phase 1. Scoping a decision problem in terms of stakeholder values and criteria
  Examine convening, process, and outcome concerns.
- Phase 2. Generating alternatives and their impacts to address the problem scope
  Examine convening, process, and outcome concerns.
- Phase 3. Evaluating alternatives and recommending a solution
  Examine convening, process, and outcome concerns.

### Situation Phase-Constructs

Has GIS been useful / is GIS useful / or can it be useful, as articulated within a description of all (or a selected set of) constructs within each (or selected set of) phases associated with geospatial information use? The EAST2 framework uses the same eight constructs to model "complexity" in each of the phases (see Figure 1), whether it be the three A-D phases mentioned above (Jankowski & Nyerges, 2001), or any number of phases as motivated by a particular organizational decision situation. Remember, as mentioned earlier, the grouping of constructs into three categories (convening-input, process, and outcome concerns) in Figure 1, *is not* the same idea as the three phases, but is a way of generalizing and clarifying the character of the constructs. Using the constructs grouped by

concerns provides a way of turning a *decision situation overview* assessment into a Phase-based decision situation assessment. The compatibility is clear. Thus, the eight constructs in essence become the building blocks for our understanding of how people engage within EACH phase. The constructs establish a foundation for learning about a particular phase, and guide a GIS analyst to conclude what is important for a particular decision situation assessment. We now note that differences in constructs emerge when articulated from one A-D phase to the next.

## Situation Phase-Construct-Aspects

Has PGISystem been useful / is PGISystem useful / or can it be useful, as articulated within a description of all (or a selected set of) aspects, within all (or selected set of constructs) constructs, within each (or selected set of) phases associated with geospatial information use? Each of the constructs can be described in terms of "aspects" of the decision situation (see bulleted items in Figure 1). Aspects in a sense are like "metavariables", that is when enumerated and articulated they can be understood to influence each other within a phase or even across phases of the decision process. These metavariables form a basis for "social science based evaluation" of decision processes (Jankowski & Nyerges, 2001), which is why the decision situation assessment framework can lead to a deep and broad understanding of a decision situation. When we take the framework to this level, and consider the relationships among constructs and aspects then, we are using the framework at a theoretical level as presented by Jankowski and Nyerges (2001).

## FUTURE TRENDS

Decision making is likely to become more complex rather than less complex, as societies discover more externalities to include within decision situations. The framework presented herein is not a software tool per se, but a thinking tool that can help sort through the complexity of problems that are to be addressed with PGISystem software tools. This framework can be implemented within a word processor, as we have done for land use, transportation and water resource studies. We encourage others to do the same. The PGISystem-based software tools that are growing in popularity worldwide, and discussed in other sections of this book, might some day incorporate some of the framework. We are working on such research as related to Web-based decision support tools, but these are not ready as yet (see www.pgist.org)

## CONCLUSION

When elected officials, agency specialists, and interested and affected parties together allocate resources within and across jurisdictional boundaries in an efficient, effective, and equitable manner, they are performing democratic governance at its best. A major goal of PGIScience, as a subfield of GIScience, is to provide a systematic, conceptual foundation for the development and use of PGISystem technology to support efficient, effective, and equitable allocation of resources—within whatever definition of those three concepts a community decides. A major concern within PGIScience is bridging a gap between theory and application of PGIS, as sound frameworks can lead to more robust as well as flexible technologies that can address complex geospatial decision support problems. EAST2 provides such a bridging of the gap, as it helps decision analysts assess complex circumstances both broadly and deeply. Finding an appropriate mix of that breadth and depth is up to an analyst. With four different levels of decision situation assessment possible as described herein, we have found success in a variety of applications. We encourage others to consider use of the framework, scientists and practitioners alike, and look forward to hearing about their efforts.

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## KEY TERMS

**Analytic-Deliberative Decision Process:** The analytic component of a decision process provides technical information that ensures broad-based, competent perspectives are treated. The deliberative component of a decision process provides an opportunity to interactively give voice to choices about values, alternatives, and recommendations.

**Decision Situation:** The collection of content, structure, process, and contextual elements associated with people addressing a decision problem.

**Decision Situation Aspect:** A basic element of enhanced adaptive structuration theory, organized in terms of decision situation constructs.

**Decision Situation Assessment:** An investigation of complex decision problems that makes use of the theoretical framework in enhanced adaptive structuration theory.

**Decision Situation Construct:** Eight categories of a decision situation phase, each construct organizing a collection of decision situation aspects.

**Decision Situation Phase:** Any major event in a decision situation composing the process of a decision situation.

**Enhanced Adaptive Structuration Theory:** A theory of complex decision making supported by advanced information technology, particularly participatory geographic information systems.

**Macro-Micro Decision Strategy:** A two-level characterization of decision process in terms of major phases (outcomes of major steps) and micro activity (actions of the minor steps).

**Participatory Geographic Information System:** A geographic information system, an information technology composed of computer mapping software integrated with database management software and spatial analysis software, specifically developed to address complex geospatial problems within a group setting.

**Participatory Geographic Information Science:** A subfield of geographic information science that combines in a systematic manner theoretical, methodological, and substantive concepts within a group context.

# Pension Portal where Users are the Focus



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## INTRODUCTION

The societal task of e-government services is to support the achievement of the aims of citizenship (i.e., participation in society and personal independence), that is, autonomy (cf. Barbalet, 1988, p. 68-69; Roche, 1992, p. 93-94). These aims require many different resources of citizens, including for instance societal information serving practical needs and the ability to obtain this information. Knowledge about one's own social rights, such as pensions, is the type of information that citizens usually need at some point in their lives and also obtain through various means, using for instance their own "network competence" (see Jääskeläinen & Savolainen, 2003). Network competency stands for the knowledge of networked information sources and services plus their skilled utilization (Savolainen, 2002, p. 218).

E-government, where the starting point is the verified needs of the citizens and which applies information technology to everyday life, promotes the realisation of citizenship. In order for public Internet services to fulfil this obligation, different sets of criteria have been created and competitions have been held. One such contest is the eEurope Awards. The Finnish Internet Portal for Pensions "Tyoelake.fi" was ranked among the first five in the category "Better Life for European People." (www.e-europeawards.org/html/body_results) This article describes the features which explain why the Tyoelake.fi service is an example of an eGovernment service built through cooperation between many active parties and where the user viewpoint is crucial.

## BACKGROUND

The aim of the eEurope Awards is to develop modern public services. The eEurope Awards are organised by the European Institute of Public Administration with the support of the Information Society Technologies Programme of the European Commission for the years 2003-2005. The overall goal of the eEurope Awards is to promote best practices in order to make Europe the most competitive knowledge-based economy by 2010. The applications submitted for the eEurope Awards are evaluated and ranked by an independent jury composed of eminent experts from all over Europe in the relevant fields. (www.e-europeawards.org.)

Considerations affecting the evaluation include access, user-friendliness, and usability, user-centred organisation of the information, cheapness of usage, and application of commonly used technology. Other positive features are taking into account of special groups as well as the increasing of democracy, of openness, of approachability, and of participation, cooperation between the private and the public sector as well as the experiences gained; how the service saves the citizens' money, improves quality of life, and the time and effort needed. In the competition, innovativeness is also important—the service should contain something new. Usability of the experiences gained and of the new ideas in other e-government services was also valued.

The Tyoelake.fi service is built and maintained by the Finnish Centre for Pensions, the central body of the private-sector earnings-related pension scheme. In Finland for private-sector employers, employees, and self-employed persons earnings-related pensions are handled by private sector pension providers that partly compete with each other. Earnings-related pensions from public-sector employment, such as employment by central and local government, are administered through their own pension providers. The employment registers of the Finnish Centre for Pensions contain, among other things, data on all the employment contracts in Finland over a period of 40 years needed for the calculation of pension accrual.

The motives for developing the Web service Tyoelake.fi can be found in the development of the population in Finland. The large age groups born after the Second World War are approaching an age when personal interest in pension matters increases. There is a desire to direct part of the increasing demand towards electronic self-service. At the same time, there was a desire also to give others than those approaching retirement age a chance to receive information about their pension accruing from work and to monitor matters relating to their own pension benefits. This can be seen as promoting the mobility of labour both inside and outside Finland.

## USER-CENTRED CONTENT AND BROAD ACCESS OF THE SERVICE

Planning and building the Tyoelake.fi service was an administrative challenge, which required the cooperation of more than 50 authorized pension providers. The Finnish Centre for Pensions was responsible for creating the service. Also, the Tyoelake.fi service is currently managed by a committee of parties responsible for private sector, central, and local government pensions. Most parties participating in this cooperation already had their own Web pages, but the general view was that creating a joint authentication solution would save costs. In addition, a common comprehensive site was the aim, with access to the pension providers' own Web pages. From the users' viewpoint, the

pension scheme is a comprehensive whole and the underlying administrative model is of little significance to them.

The Web site is intended for ordinary citizens actively participating in working life whose pensions accrue from salaried employment or self-employed activities. However, the majority of users are people who will retire within the next few years. The contents of the Web pages are based on these people's information needs as identified through experience and surveys. They include general information about pensions, personal services, and also forms. Information can be searched for through the content structure, through the section with questions, through the search functions or through the pages targeted at different age groups.

In the left-hand column, the structure of the data contents show the main sections, which are pension accrual, amount of the pension, questions, pension benefits, insurance, the statutory earnings-related pension scheme, reforms, application forms, and links. The structure of the sections follows the principle of going from general information to more specific information. The language used is indented to be simple standard language. Special terminology and references to the legislation are avoided. When a special term appears in the text, it is explained in a special pension glossary, and the text has a link to the glossary. User focus also includes a section with questions, where the multiple examples provide an opportunity to identify with the situation of the person in the example.

The services of the Web site are contained behind the key "personal data." Personal data refers to the personal services which require authentication, of which there are currently five: employment record, estimate of the pension amount, pension calculator, contact data to one's own pension provider, and further questions.

The keys for young adults, the middle-aged, and the aging lead to a page with topics or certain selected issues from the information content relevant for each age group. For instance, young adults are provided with information about the possibility of receiving a disability pension. The issues selected are changed from time to time.

The Web site has been built to be trilingual, thus the contents are available in the official national languages, Finnish and Swedish, and also in English. Since the Web site is in three languages, it is made available to all the potential users. The text version made for the visually handicapped further extends the number of users.

The user has also been in focus in the technical build-up of the Web pages as it does not require the latest hardware or software. Instead, the Web site can also be used with old PCs intended for use by individuals at home.

Notices are published in the middle column of the front page and topics of special interest to users are found in the right-hand column. The feedback and the questions that the users have asked about pension benefits are transmitted by electronic mail. For the administration of the feedback and the questions, a course of action utilising the current decentralised service network has been created. The service is thereby directed to the party who is able to clarify the matter in the best possible way.

## SEVERAL MEANS OF AUTHENTICATION

In the Tyoelake.fi service there are several means of authentication. The insured user may use a card with PKI technology. The card contains the Population Register Centre's certificate. The other option is to use the authentication technology of one's own Internet bank, in which case the bank verifies the identity of the client. Online banking is used extensively throughout Finland, and consequently the service already reaches approximately 80% of the working population. In Finland, the use of information networks and the utilisation rates of the Web services provided by banks are very high in international comparison. The banks are not entitled to store the service users' data. For the service, the earnings-related pension scheme pays the banks an agreed price. The insured individual does not incur any costs from the service, but on the contrary saves time and trouble, which is beneficial to well-being. The implementation has also been carried out in good cooperation with the Data Protection Ombudsman and other authorities.

The exchange of personal data has been protected by SSL encryption. The e-mail messages between the organisations offering the service are sent through the VPN network. The replies to the questions asked by the users are sent through open e-mail, but the e-mail messages only include general information as personal data is sent by letter to the address stored in the population information system. In the data transfer between the portal Tyoelake.fi and the authorised pension providers, the parties are identified by means of certification.

The introduction of the authentication service of monetary institutions in a public service www.tyoelake.fi was a unique solution in Finland and internationally and unprecedented in an open service using huge national registers. The authentication solution of the portal Tyoelake.fi is cost saving. The service improves insured individuals' opportunities to verify the correctness of their own data included in the registers and to receive individual information on their pensions. This strengthens the confidence in the statutory pension provision and the social rights, and gives insured individuals a more secure basis for future planning.

## THE NEEDS OF CITIZENS IN ELECTRONIC PENSION SERVICES

During the planning of the service, the target group was defined as citizens in need of pension information. The authorities, personnel within the industry, researchers, and politicians were excluded from the target group. Their need for special information is answered by the Web pages of the Finnish Centre for Pensions, www.etk.fi. In this way, it was possible to concentrate in the

Tyoelake.fi service on information relevant for the lay people.

In the pension scheme, practical information has accumulated in different ways about what kind of information users request on pension matters. The view of the citizens gathered through client contacts is incomplete, however, as those contacting the service are a selected group and as such not sufficiently representative of all users. Only after a survey based on a selection representing all citizens can a fairly accurate picture be drawn. The reliability is enhanced by repeating the survey using the same question. Such surveys were done in 2001 and in 2003.

The surveys were carried out by the market research company Taloustutkimus Oy as part of the Omnibus Study, where a nationally representative sample of Finns aged 15-79 is subjected to a computer-supported interview face-to-face. For pension matters, the interviewees were aged 20-64 and numbered about 800. The interviewees were shown a list of pension information and services related to pensions, and asked item by item if they might need it within a year if the information or service were available on the Internet. The questions were:

- I check if all my employment contracts have been entered into the register and that the data are correct.
- I estimate the amount of my own pension
- I obtain information about pension benefits, for instance about the eligibility criteria
- I want personal advice and information in my own case
- I look for information about the effect of work abroad on my pension provision.
- I file my own pension application.
- I look for lectures, training, or study material.
- I look for general information about the pension scheme (for instance statistics, studies, reports).
- I look for information on current pension topics, for instance pension contributions, indexation, legislative reforms

The background variables included all the general social background variables as well as use of the Internet. The results were analysed both as percentages with t-tests and through a multiple-variable analysis. All the information sectors and most of the services were included in the first version of the Tyoelake.fi portal, but the electronic pension application will be included in the version in 2006. A complete pension estimate including employment in both the private and the public sectors will perhaps not be taken into use until 2009.

In short, the results (Jääskeläinen, 2004) show that the willingness to use the Internet is connected to, on the one hand, familiarity with using the Internet and, on the other hand, with age. When nearing retirement age the need for different pension services is greatest. One fourth of Finns aged 50-64 thought they might well also need electronic pension services in the near future. The entitlement criteria for a pension and the bases for its calculation as well as current topics are more important information for them than for others. About half of the age group is familiar with the Internet.

The needs for pension services among the middle-aged are more specific than among those nearing retirement age. The checking of one's own employments is the most important pension service for the age group. Since about 75% of the age group is familiar with the Internet, it can be estimated that every third needs some electronic pension services. In the younger age groups, too, the opportunity to check one's employment data in the register was the most sought-after service. The youngest respondents were further interested mainly only in the effects of work abroad on pension accrual. For the young age groups using the Internet is natural in all pension services.

In the 2003 survey the respondents' opinions on using the banks' authentication services for the pension scheme were also ascertained. As a principle this is a question of rare cooperation between the private and the public sector in developing an Internet service. Statutory pensions are considered public services even though in Finland the implementation of private-sector earnings-related pension provision is the responsibility of private pension providers. Then again, the activities of financial institutions are definitely a matter for the private sector, as seen, for instance, in the fact that the banks sell personal pension insurance. The vision or fear of the data of a financial institution selling personal pension insurance and of a pension provider carrying out a public obligation being transferred from one to the other through a common authentication service would impair the trust in the data protection of the pension scheme.

The results show that a quarter (25%) of respondents think the use of bank codes a good solution and just as many think it is a bad solution. It is worth noting that every second respondent immediately formed a clear opinion either for or against. Half of the respondents fell into the middle categories, with equal proportions for and against (16% and 18%). Only 16% could not state their opinion. Simplified, the opinions on the use of bank codes divide the population just as do the opinions on other technical innovations. The first to try out innovations are young men living in the south of Finland. The usage spreads rapidly over the whole country from south to north so that the last to adopt the innovation are those living in the north, and there more often woman than men.

## FUTURE TRENDS

In 2003, the Tyoelake.fi services had about 200,000 visits. The following year (i.e., in 2004) the number of visitors was some 30% higher than during the first year. In all, the Tyoelake.fi service has during its first two years of existence been used by 15-20% of the potential users (i.e., of the Finnish population aged between 20 and 64 years). The service has not yet met the level of demand indicated by the demand survey. The main reason is probably that the service is not well known by all citizens who use the Internet. Minor reasons are probably prejudices against using banks codes in interactive services.

The success of the first stage of the cooperation project has created good opportunities for further development. The planning of the next stage is ongoing. The objective is an online pension application service and its connection to the processes of the investigating institution. By means of the authentication solution now achieved, the opportunities arose for creating a controlled electronic process for pension applications, too: on the initiative of the party insured to the authorised pension provider's pension adjudicator and further to the payment of the pension into the individual's bank account.

The intention is to implement the first version of the old-age pension application in the Tyoelake.fi service in 2006. Those reaching retirement age (63 years) then are those born in 1943. Since many are already retired and some do not use electronic services, filling in applications over the Internet may not at first be very frequent. In the long term it can be assumed that electronic services related to pension applications will be used by every other citizen.

## CONCLUSION

It can be said that in Finland, the period in e-government of interactive services that reach all citizens really started when the authentication solution in the Tyoelake.fi service was taken into use at the end of 2002. An authentication service was rapidly taken into use in the Web services of certain large pension providers. The pension providers were able to develop additional services making use of the authentication service for their own clients. In February 2003, the National Board of Taxes, the Social Insurance Institution, and the Ministry of Labour concluded an agreement on the matter and one year later they had implemented the same mode of authentication in their own services.

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## KEY TERMS

**Authentication:** The verification of the identity of a person or process. Determines a user's identity, as well as determining what a user is authorised to access (e.g., a financial database or a support knowledge base).

**Identification Card (ID Card):** A secure network key for all online services requiring the identification of a person, such as all government and many private-sector services. The card enables the service provider to reliably identify the user. In addition to the card, a card reader is needed for online use.

**Identification Service:** A standardised identification service approved by the data protection authorities and sold by a service producer to other service producers. The service producer receives remuneration for the service either from the user of the service or from another service producer. The service may function on the Internet or through mobile devices.

**Network Competency:** Knowledge of networked information sources and services plus their skilled utilisation.

**Online Banking, Telebanking, Electronic Banking, Web Banking:** Includes various services related to the payment of invoices, account information, securities trading, loan application and loan information as well as opportunity for electronic communication with the bank and vice versa.

# Performance Reporting on United States Digital Government



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## INTRODUCTION

Starting in the 1980s, Australia, Canada, New Zealand, and the United Kingdom faced serious economic problems, such as economies dominated by government spending and high budget deficits. Further, government studies in the four countries found that government organizations lacked accountability for achieving program results and that there were many constraints to increasing such accountability. In response to these problems, each of the countries embarked on comprehensive reforms intended to increase the accountability of the civil service for the effective and efficient management of government programs. In exchange for increased accountability for results, the countries provided program managers with more flexibility in their use of resources. The studies and subsequent reforms in these four countries proposed results-oriented management reforms that were subsequently adopted in the United States (U.S.).

The approaches these countries took to implement results-oriented management reforms included departments and agencies establishing and communicating a clear direction by defining their missions and goals through strategic planning, establishing annual objectives that were directly linked to missions and goals, measuring performance to assess how well objectives were being met, and reporting on progress. The countries derived a number of key lessons from their experiences in developing performance measurement systems. These lessons focused on enhancing the usefulness of performance information to management for improving program results. The countries sought to reinforce this focus on results by holding agency management accountable for the results that agencies were trying to achieve. For example, the countries used performance agreements between different levels of management to ensure accountability for achieving agreed-upon performance goals. Cunningham and Harris (2005) discuss how performance reporting has been implemented in Canada, the United Kingdom, and three states in the United States. This article discusses how performance-reporting requirements in the U.S. are intended to promote a results-oriented management and decision-making process within Congress and the executive branch, as well as accountability to the American public, specifically for digital government programs.

## BACKGROUND

Recognizing the magnitude of modern challenges facing the federal government, Congress has encouraged a more performance-based approach to program management and accountability within the federal government, enacting the Government Performance and Results Act of 1993 (GPRA), perhaps the best-known performance-based law. GPRA requires agencies to develop strategic goals, which explain what results are expected from agencies' major functions and when to expect those results. Such goals are an outgrowth of the mission and are very often results, or outcome, oriented. GPRA also requires agencies to develop annual reports to Congress. These reports include (1) strategic plans, which define missions, establish results-oriented goals, and identify strategies for achieving goals; (2) performance plans, which articulate goals for the upcoming fiscal year that are aligned with long-term strategic goals; and (3) performance reports, which measure performance toward the achievement of the goals in annual performance plans. To be most useful, program managers should consider the reports developed in response to GPRA when they write the performance reports required by specific information technology (IT) and e-government laws discussed in this article.

Some of the first IT performance-based laws, focusing on the importance of using IT to improve government operations, were the Paperwork Reduction Act of 1980 (reauthorized in 1995), the Computer Security Act of 1987, and the Clinger-Cohen Act of 1996. Congress recognized the growing importance of e-government in 1998 by enacting the Government Paperwork Elimination Act. It requires federal agencies to use IT in order to provide the public, when practicable, the option of submitting, maintaining, and disclosing required information electronically. The E-Government Act of 2002 includes promoting the use of the Internet and other IT to provide government services electronically; strengthening agency information security; and defining how to manage the federal government's growing IT personnel needs. In addition, this law established an Office of Electronic Government within the Office of Management and Budget (OMB), to provide strong central leadership and full-time commitment to promoting and implementing IT and e-government.

*Table 1. IT performance-based laws and purpose*

| IT law | Purpose |
|---|---|
| Computer Security Act of 1987 (CSA) | • Improve the security and privacy of sensitive information in federal computer systems |
| Paperwork Reduction Act of 1995 (PRA) | • Minimize the public's paperwork burdens<br>• Coordinate federal information resources management<br>• Improve dissemination of public information<br>• Ensure the integrity of the federal statistical system |
| Clinger-Cohen Act of 1996 (CCA) | • Improve federal programs through improved acquisition, use, and disposal of information technology resources |
| Government Paperwork Elimination Act of 1998 (GPEA) | • Require federal agencies to provide the public, when practicable, the option of submitting, maintaining, and disclosing required information electronically |
| Government Information Security Reform Act of 2001 (GISRA) | • Directs federal agencies to conduct annual IT security reviews<br>• Inspectors general (IGs) to perform annual independent evaluations of agency programs and systems and report results to OMB<br>• OMB to (1) report annually to Congress on government wide progress and (2) issue guidance to agencies on reporting instructions and quantitative performance measures |
| E-Government Act of 2002 (E-Gov) | • Promote the use of the Internet and other IT to provide government services electronically<br>• Strengthen agency information security<br>• Define how to manage the federal government's growing IT human capital needs<br>• Establish an Office of Electronic Government, within OMB, to provide strong central leadership and full-time commitment to promoting and implementing e-government |
| Federal Information Security Management Act of 2002 (FISMA). (FISMA is Title III of the E-Government Act and updates GISRA) | • Lay out a framework for annual IT security reviews, reporting, and remediation planning<br>• Streamline the government's information resources, close security gaps, and create more public-centered Web sites |

## LAWS FOR PERFORMANCE-BASED MANAGEMENT AND ACCOUNTABILITY

GPRA—or "the Results Act"—is a key performance-based law for management and accountability. Prior to enactment of GPRA, policymaking, spending decisions, and oversight had been severely handicapped by a lack of (1) sufficiently precise program goals and (2) program performance and cost information. GPRA sought to remedy that situation by following private sector best practices, requiring agencies to set multiyear strategic goals and corresponding annual goals, to measure performance toward the achievement of those goals, and to report on progress made.

Digital, or e-government, is the use of IT and the Internet to transform federal agency effectiveness—including efficiency and service quality. Several U.S. laws contain IT and e-government performance-reporting requirements, including the Paperwork Reduction Act, the Computer Security Act, the Clinger-Cohen Act, the Government Information Security Reform Act (GISRA), and the E-Government Act. In instituting IT performance-based laws, Congress followed private sector best practices, as with GPRA, enabling agencies to more effectively manage IT requirements. Under IT performance-based laws, agencies are to better link technology plans and IT use to program missions and goals. To do this, agencies are to (1) involve senior executives in IT management decisions, (2) establish senior-level chief information officers (CIOs) who are to evaluate IT programs on the basis of applicable performance measurements, (3) impose much-needed discipline on technology spending, (4) redesign inefficient work processes, and (5) use performance measures to assess the contribution of IT to the achievement of mission results. In addition, laws such as the Computer Security Act of 1987, as amended in 1996, address the importance of ensuring and improving the security and privacy of sensitive information in federal computer systems. IT performance-based laws, including purposes, are summarized in Table 1.

The Clinger-Cohen Act (CCA), like the acts discussed above, imposes rather detailed reporting requirements on federal agencies (Mullen, 2005a, 2005b, 2006). The CCA requires OMB to do the following:

- Issue directives to executive agencies concerning capital planning and investment control, revisions to mission-related and administrative processes, and information security
- Promote and improve the acquisition and use of IT through performance management
- Use the budget process to (1) analyze, track, and evaluate the risks and results of major agency capital investments in IT and information systems and (2) enforce accountability of agency heads
- Report to Congress on the agencies' progress and accomplishments

CCA also requires additional reports to Congress from OMB, agency heads, and GAO.

The Government Paperwork Elimination Act (GPEA) of 1998 authorizes OMB to provide for acquisition and use of alternative IT by federal agencies. Alternative IT includes (1)

*Box 1. E-Government Act (E-Gov) provisions*

- Directs OMB to establish an interagency committee on government information and to issue guidelines for agency Web sites
- Requires federal courts to establish Web sites with information about the court and cases being presented
- Requires federal agencies to adhere to uniform security standards for information
- Creates an IT interchange program between the private and public sectors
- Authorizes government wide use of share-in-savings contracts, which permit agencies to pay contractors using savings realized through technological improvements
- Requires federal agencies and OMB to submit reports to Congress

electronic submission, maintenance, or disclosure of information as a substitute for paper and (2) electronic signatures in conducting government business through e-government transactions. The law calls for the director of OMB, in conjunction with the National Telecommunications and Information Administration, to study the use of electronic signatures in e-government transactions and periodically report to Congress on the results of the study.

The Government Information Security Reform Act (GISRA) is intended to do the following:

1. To provide a comprehensive framework for establishing and ensuring the effectiveness of controls over information resources that support federal operations and assets
2. To recognize the highly networked nature of the federal-computing environment, including the need for federal government interoperability and, in the implementation of improved security management measures, ensure that opportunities for interoperability are not adversely affected
3. To provide effective government-wide management and oversight of related security risks, including coordination of information security efforts throughout the civilian, national security, and law enforcement communities
4. To provide for development and maintenance of the minimum controls required to protect federal information and information systems
5. To provide a mechanism for improved oversight of information security programs in federal agencies

The E-Government Act (E-Gov) was passed to enhance the management and promotion of e-government services and processes. To increase citizen access to government information and services, the law created an office with the position of Administrator of E-Government and Information Technology within OMB—which oversees information resources management (IRM), including development and application in the federal government—and established a broad framework of measures that require the use of Internet-based IT. The act also authorizes $45 million for an e-government fund (and additional amounts in following fiscal years), to pay for IT projects aimed at linking agencies and facilitating information sharing. However, actual appropriated funding has not exceeded $5 million in any fiscal year. Title III of the E-Government Act is also referred to as the Federal Information Security Management Act (FISMA). FISMA updates GISRA by laying out a framework for annual IT security reviews, reporting, and remediation planning. The act is designed to streamline the government's information resources, close securities gaps, and create more public-centered Web sites. E-Gov provisions are listed in Box 1.

As shown in this section, there are many reporting requirements affecting federal IT and e-government.

## FUTURE TRENDS

In their efforts to develop useful performance reports for congressional users (or other types of users), those preparing the reports need to keep in mind that there are clear limits to the amount of information decision-makers can handle cognitively. This harkens back to the days of Herbert Simon, but also addresses one of the frequent failures of budget reform—failing to take into account legislative branch input and sensitivities. Just as importantly, when proposing performance measures, the would-be implementers need to factor end-use into the equation. As noted by Berman and Wang (2000),

*Stakeholder (or political) capacity concerns the nature of support for performance measurement... There is widespread agreement that management reforms require support from top management. Support from elected officials is critical because it forecloses back channels, legitimates reforms and new performance expectations, and helps ensure funding for new efforts. In this regard, some states, such as Minnesota, mandate the use of performance measures by counties, often as part of county budgeting and strategic planning.* (Berman & Wang, 2000, p. 410)

Another frequent problem in developing useful performance reports is the failure to link performance measures and cost data. This reflects, among other things, an unwillingness to reveal cost and the belief that "cost-effectiveness" may not be as important as perceived or actual service quality. Again citing Berman and Wang (2000), "The lack of support, especially from legislatures, is a commonly cited reason for budget-reform failure ... Elected officials are reluctant to give support when they view it as a ploy by bureaucrats to "technicalize" their operations and thereby avoid legislative scrutiny." Ammons (1999, p. 106-107) also noted this pitfall of performance reporting when he said,

*The problem is this: unless a government ties its performance measures* meaningfully *into management systems—unless those measures are something more than decorations for the budget document, as superficial reporting practices have been called derisively—any enthusiasm for measurement will quickly lose its luster, and probably deserves to. Officials moving toward a results orientation are well advised to think about application of performance measures right from the start. Think about application at every stage. Measurement flourishes—and deserves to flourish—only if it is used and is useful.*

It is worth noting here the fact that while cost data were a cornerstone of the Hoover Commissions of 1949 and 1955, nearly six decades later we still can't "merge" GPRA with the CFO Act by successfully linking performance information with budget/financial information. Although linking costs to performance goals is not a requirement of GPRA, both GPRA and the CFO Act emphasized the importance of linking program performance information with financial information as a key feature of sound management and an important element in presenting to the public a useful and informative perspective on federal spending. The committee report for GPRA suggested that developing the capacity to relate the level of program activity to program costs, such as cost per unit of result, cost per unit of service, or cost per unit of output, should be a high priority. GAO's 2003 survey of federal managers asked, for the first time, the extent to which federal managers had measures of cost-effectiveness for the programs with which they were involved. Only 31% of federal managers surveyed reported having such measures to a great or very great extent. This was lower by at least 12% than the results for any of the other types of measures associated with GPRA asked about in the survey.

The president's Management Agenda has set an ambitious goal for performance budgeting, calling for agencies to better align budgets with performance goals and focus on capturing full budgetary costs and matching those costs with output and outcome goals. All this suggests that agencies will need to develop integrated financial and performance management systems that will enable the reporting of the actual costs associated with performance goals and objectives along with presentations designed to meet other budgetary or financial purposes, such as the accounts and program activities found in the President's Budget and responsibility segments found in financial statements. However, of the six agencies GAO reviewed for a 2004 comprehensive study of GPRA's implementation over the last decade, only the Department of Education's report clearly linked its budgetary information to the achievement of its performance goals or objectives. Education's report laid out, using both graphics and text, the estimated appropriations associated with achieving each of its 24 objectives. In addition, the report provided the staffing in full-time equivalent employment (FTEs) and an estimate of the funds from salaries and expenses contributing to the support of each of these objectives (GAO, 2004, p. 65).

## CONCLUSION

The purpose of reporting requirements is to strengthen management controls and processes to increase agency accountability. The information required in reports to Congress is intended to be a valuable resource for Congress. It can use this information in carrying out program authorization, oversight, and appropriations responsibilities, as well as to ensure the public a more accountable and responsive government. An excessive number of reports on different issues within an agency are not likely to get the attention of busy congressional decision-makers or the public. One consolidated report—containing useful and understandable information dealing with an agency's performance management, financial management, and IT issues—is more likely to fulfill the intent of laws with reporting requirements: to produce useful information that had not previously been available. The information in a user-friendly, one-volume report, as envisioned by Congress with passage of the Reports Consolidation Act of 2000, is much more likely to be read and acted upon. To be most useful, each report should be readable (include an executive summary and be as brief as possible) and easily available on agency Web sites (Mullen, 2005).

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## KEY TERMS

**E-Government:** The use of information technology (IT) and the Internet to transform government agency effectiveness—including efficiency and service quality.

**Performance Agreements:** Written agreements made between different levels of management to ensure accountability for achieving agreed-upon performance goals.

**Performance Measurement:** The ongoing monitoring and measurement of program accomplishments, particularly progress towards pre-established goals. Program or agency management typically conducts it.

**Performance Plan:** Annual reports in which government agencies articulate goals for the upcoming fiscal year that are aligned with their long-term strategic goals, and are to be linked to the program activities displayed in their budget presentations.

**Performance Report:** Annual reports in which agencies measure performance toward the achievement of the goals in their annual performance plans. If a goal was not met, the report is to provide an explanation and present the actions needed to meet the unmet goal in the future.

**Reporting Requirements:** Statutory provisions requiring the President (or head of government) or government agencies to submit specified information, often on an annual or recurring basis, for the purpose of assisting legislative oversight.

**Strategic Goals:** Explain what results are expected from government agencies' major functions and when to expect those results. Such goals are an outgrowth of the mission and are very often results, or outcome, oriented.

**Strategic Plan:** Annual reports in which government agencies define their missions, establish results-oriented goals, and identify the strategies that will be needed to achieve those goals.

# Portals for the Public Sector

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## INTRODUCTION

The term "portal" is traditionally associated with doors and gates. Room and front doors are used as simple entrances into a building or a room. Larger gates are constructed for the passage of vehicles. In ancient times the word "portal" was used mostly for monumentally designed entrances of buildings, castles, palaces, or cities, and triumphal arches. With the success of the World Wide Web (WWW) in the middle of the 1990s the term "portal" has a new meaning in a completely different context. Commercial providers of online services, search engines, and directories of Web-based links renamed their services as portals or starting points for the Internet. The providers of these portals were able to list their shares on stock exchanges with great success. Yahoo!, a commercial provider of directory services for the WWW, increased its share price steadily over 4 years since the initial stock exchange listing in 1996, which resulted in a true portal euphoria among investors until 2000. Merrill Lynch published a study in November 1998 about the internal use of portals and corresponding technologies in the enterprise, predicting unusually high growth rates and return on investment rates for such projects (Shilakes & Tylman, 1998). Many stock companies were able to increase their share price significantly just with the announcement of a portal strategy. Companies also began to rename their existing Web pages, online shops, and electronic markets as "portals," entirely in the sense of superb entrances, although most of these services had no real portal functionality. Everyone just wanted to participate in the portal success. But only a few participants had an exact idea of the meaning behind the term "portal."

## BACKGROUND: PORTALS AND PORTAL TECHNOLOGIES

Portals are easy-to-use, secure, and personalizable access systems with which users receive access to information, applications, processes, and persons which are available on the systems covered by the portal with consideration to their respective access authorization. Access to a portal can take place according to the multichannel principle, via different media and access channels. Portals are therefore not restricted to Internet technologies. Access would also be possible with other communication technologies and channels. The direct electronic channel, the speech-telephonic channel, the personal channel and the written channel are the most important ones (von Lucke, 2005).

The direct electronic channel has a special role for all channels, because it offers all users direct access to the systems covered by the portal. Therefore, it is the foundation for any portal access via other channels. Users of the electronic channel utilize modern information and communication technologies for receiving services electronically via internal data networks, the Internet, an extranet, and an intranet, via interactive digital television, or mobile phone data networks. Using the speech-telephonic channel, there is a telephone conversation between the user and an agent of a call center, for example, who has desktop access to the electronic channel and who can read the results on the telephone. Using the personal channel, there is a personal conversation with an agent in his or her office or at his or her counter, who also has direct access to the electronic channel. Even written inquiries can be answered by any agent, who has access to the electronic channel. The integration and coordination of the different channels are tasks of the multichannel management. This includes all required measures for the involvement of the four distribution channels into the demand and production processes.

Portal systems have integrating components so that the Internet Web site, the call center and the offices could make use of the same knowledge databases and profit from the experiences of the other distribution channels. This multichannel portal concept reduces the menace of the digital divide because the whole population will be reached via the portal, independent of the communication channel (von Lucke, 2004, pp. 80-81).

Different functions are associated with portals. A row of portal functions corresponds to a conventional entrance area which opens rooms behind it. References are given, what or who is where. Personal information is given, security examinations are undertaken, access authorization is controlled, inquiries and orders are taken, purchases are delivered, and payment processes are completed (Reinermann, 2002, p. 129). Other functions have to do with the access to systems in the background, their integration, and the uniform presentation corresponding

to the expectations of the user. So-called *portal technologies* secure these functionalities. Behind these are software technologies, which have already been available for a longer time, but whose combination in a portal offers users real additional value for the first time. Portal technologies need to be differentiated into which are essential and which are optional technologies. Portal management, access services, presentation, navigation, and integration are essential portal technologies. They are core components of each portal, independent from which access channel is used or how the systems are integrated. Personalization, publishing services, document management, process management, security services, search and research services, analytical services, and collaboration services are optional. Therefore portals are not only genuine access points. They can offer additional services through the portal technologies. Sometimes portal technologies are sold separately. Sometimes they are bundled with other portal technologies in software packages in order to be marketed as autonomous portal systems. Various applications and technologies can be included in these systems. Therefore portal technologies can be allocated in completely different systems. At the moment there are providers of original portal systems whose software includes the basic functionality for the operation of a portal, and there are providers of classic software applications which enhance their products with portal functionality (Correia, Biscotti, Wurster, & Dharmasthira, 2005; von Lucke, 2004, pp. 81-82; Phifer, Valdes, Gootzit, Underwood, & Wurster, 2005).

## PORTALS FOR THE PUBLIC SECTOR

The connection of the portal concept with the public sector leads to the development of portals for the public sector. These are portals which are designed for use in the public sector. Such a concept corresponds to the basic consideration of one-stop government services. It lends itself to the concept of one-stop government which tries to integrate different public services independently from their ownership by a local, subnational, national, or international agency in one point of contact and in one process. In this sense, portals for the public sector are easy-to-use, secure, and personalizable access systems, with which users receive access to information, applications, processes, and persons from parliament, government, administration, justice, and public corporations. These are available on systems of the public sector which are covered by the portal, with consideration to their respective access authorization. Access to the portal can take place according to the multichannel principle via different media and access channels. The concept is therefore not restricted to the Internet and can be transferred to the complex reality of the public sector.

Portals for the public sector can be subdivided into self-service portals and mediator portals. While self-service portals allow users (employees or citizens) direct access, mediator portals are self-service portals for mediators of the public sector, which offer them additional background information and mediator-specific working directions. They support administrative mediators in call centers, citizen agencies, and citizen shops, but also mediators like social workers, physicians, or other mentors for citizens. Like any other portal they can be used as a central front-end system for users and as a central communication and integration platform for the background computer systems (von Lucke, 2004, pp. 83-84).

## CHARACTERISTIC STAGES OF PORTALS FOR THE PUBLIC SECTOR

From the current point of view, four consequential development stages for portals can be observed. They are similar to the development stages for one-stop government (Hagen & Kubicek, 2000).

In the first stage, *simple entry point* portals simplify the access to information and public services through specially prepared orientation and signpost information. They refer to the corresponding services and lead the users to the responsible agencies and employees. They have the function of a gateway.

Portals of the second stage serve purely for information collection and diffusion. They are used for the provision of information, which is collected from different sources, bundled, prepared in simple terms and presented. Citizens use these so-called *information collection points* portals in order to get an orientation and to inform themselves about a special subject.

Portals of the third stage, the so-called *service center*, offer a seamless access to public sector information and selected public services. They allow the completion of transactions with all those agencies, which are integrated in this public sector portal. Public databases and registers are already integrated in these portals to a point that deposited data can be inserted into forms automatically and appropriately.

With an increasing networking of these single service centers there will be a *service cluster* of portals, which can communicate and cooperate collectively. Users get access to all available information and transaction services via these service clusters, independent of the provider. In the ideal scenario, all relevant participants would be

included in a cluster. These clusters enable the creation of totally new workflows and value-added chains in the public sector. They permit to bundle once-divided public services into new packages. Consequently transaction services gain significance with the public, while the providing agencies lose it. This is the fourth development stage of public sector portals. At the same time, it might be the starting point for a complete reorganization of the public sector organization (von Lucke, 2004, pp. 88-89).

## IDEALISTIC TYPES OF PORTALS FOR THE PUBLIC SECTOR

There are a lot of different portal types found in the public sector worldwide (Accenture, 2004, pp. 42-56, 61-105; Accenture, 2005, pp. 40-47, 53-97; Bent, Kernaghan, & Marson, 1999, pp. 13-100). Some of them are accessible to the public, while others are only for the internal use of an agency. Some public sector portals are designed around existing organizations while others are planned for special target groups, around methods or around objects (von Lucke, 2005).

For an outlook on idealistic types of portals for the public sector, publicly accessible portals around institutions of the public sector are a good starting point: Agency portals are designed around a certain agency or administrative unit, like a municipal office, an authority, a department, a ministry, a public institute, a public corporation, or a public foundation. Once designed as information collection points, they are developed increasingly into service centers, through which citizens and businesses can complete legally binding processes with the agency. Cross-agency portals are planned, built and operated jointly by several agencies. They try to bundle services from several agencies in one portal. Cross-agency portals can be formed in addition to the existing agency portals. They should not replace these agency portals, but rather supplement them. Government portals are designed with regard to a certain government entity. This might be the portal for the municipal government, the county government, the state government, the national government or the supranational government. As a portal to all institutions of a special government entity, it should include at least links to all of its agencies, departments, and other institutions, but could also contain specific information or public services. Cross-government portals are planned, built, and operated jointly by several governments of the same horizontal level. Vertical cross-government portals are realized and run by several government entities of different (vertical) levels of government. This enables a collaboration of national, subnational, and local level of government in one portal. Citizens and businesses are mostly interested in these portals, because they might offer one window to the whole public sector without knowing who is responsible for a special public service.

Another starting point for classifying portals is the interest of the users. While the above-classified portals integrate only public information and services, portals centered around user interests should include public, private, and third sector information as well as services. Topic portals are arranged around certain topics or subjects, with special reference to the public sector. There are a lot of potential topics which might be interesting for the users. Audience portals bundle all the relevant information and services for special target groups in one portal. The life event principle is a third arrangement concept and stands for the orientation of information, services, products, and processes toward target groups and toward their special requests in certain moments or phases of their life, from cradle to grave. In conjunction with citizens, these events are known as “life events” while for businesses the term “business event” is used. Life event portals bundle all relevant information, services, and processes around one or more life events of a citizen while business event portals do the same for one or more business events of an enterprise (BASIS, 2001). Portals for the public sector which are designed completely around its users and their needs mean a fundamental change of perspective for public administration. No longer is an orientation within the public sector important, but rather an outside orientation, tailored on the needs of citizens, businesses, and other agencies and organizations is required.

Another starting point for categorizing publicly accessible portals is a method, which uses a portal as the central communication component. Process portals open the gate to the steps of processes and the processes of value chains, so that the users have a personalized access to relevant processes. Project portals utilize project management software so that certain project targets can be reached better and so that the involved persons have one central communication platform, while at the same time they are relieved from routine project activities. Project portals support during the phases of project definition, project planning, and project execution. Knowledge portals help to organize a knowledge management system within a government agency or across several agencies. These portals assist in coordinating the knowledge of the teams, departments, and the agency. Search services and personalization functions support employees doing research. Learning portals bundle educational and training services as well as background information about courses, programs, exercises, and exams into virtual learning communities.

Finally, publicly accessible portals around objects like register portals, geoportals, and document portals open the access those objects, for example, to public registers, public geographical data, and public documents.

The portal concept can also be used within agencies and government entities. Intranet portals for departments, agencies, and government entities as well as extranet portals belong to the group of internal public sector portals around institutions. Internal portals around the needs of public sector users like employee portals or portals for mediators are not fixed to one institution. They try to bundle all relevant information and services from different sources for an internal use. The concepts of portals around methods and portals around objects can also be used for an internal purpose but the access to those portals is restricted. All these internal portals are normally planned, built, and operated by the internal information technology department. They are not open to the general public.

## FUTURE TRENDS: HIGH-PERFORMANCE PORTALS

The utilization spectrum for portals in the public sector is very broad. But in any portal-based administration the capability for action will depend crucially on these portals. Long-term outages and system crashes, which would take hours, days, or weeks, could incapacitate any agency and would be a risk for security, law, and order. If agencies want to use portals for crucial government processes, it must be guaranteed, that these portals meet the quality requirements for reliability, performance, availability, response time, security, and scalability. Even if these requirements vary from agency to agency, they are rarely fulfilled by simple portals of the first or second generation without additional quality mechanisms. This is the field of high-performance portals.

There are remarkably high requirements for high-performance portals. They have to manage high user numbers and transaction volumes in peak periods, simultaneously and with extremely low down times. Thousands of simultaneous inquiries must not overtax the system. High-performance portals should offer maximum reliability to guarantee full operational services day and night via all distribution channels. This means high expectations for the performance of the portal system. Responses to inquiries must return fast, be usable, and possess high quality for the inquirer. Users expect real-time processing without perceiving any delays. Internal availability mechanisms guarantee that access is always possible. High availability can be reached through redundancy, distributed systems, fail-over functions, and fault tolerance. Because high-performance portals are based on the multichannel principle, results can be delivered via different distribution channels, directly or indirectly via a mediator. Besides access services, their duties include security services, directory services, personalization, and single sign-on. Security services should secure all data and resources. This includes access and user control systems with registration, activation, authentication, and authorization as well as encoding, signature, and identification services. Directory services are used for user administration and can be the starting point for segmentation, individualization, and personalization of the portal. For personalization of the user interface, its content and services, any user must register himself or herself with his or her real name and his or her real identity, while for individualization the user always remains anonymous. With single sign-on one login per session is sufficient to access all services bundled by the portal. High-performance portals are in one line with the development from entry points and information collection points to service centers and service clusters, in which most portal technologies are integrated. High-performance portals must be scalable and open for several clients using the fundamental portal system for different portals at the same time without influencing each other. In addition to these technical requirements, they also have to meet the legal requirements for data protection and data security (von Lucke, 2001, pp. 293-300; von Lucke, 2004, pp. 84-86).

In the coming years high-performance portals will open an entire series of new applications which previously were unthinkable due to technical and organizational restrictions. The portal concept allows, for example, the bundling of all public services in an electronic government service portal; new models of personal data storage with the introduction of electronic administration files, citizen files, and document safes; new account models with the introduction of citizen accounts, business accounts, tax portals, and payment portals; more transparency in the public health sector with health portals and health care files; as well as more citizen participation with personalized community portals (von Lucke, 2005).

Regarding these considerations, high-performance portals are a very crucial instrument for government and administration. They have the potential for a sustainable redesign of the public sector. Only high-performance portals offer the high-quality standards secured by service-level agreements that agencies demand for the substitution of established procedures and practices. But only if these portals can contribute something to an immense improvement in fulfilling their tasks, agencies will be ready for a change. Their potential is more than just the digitalization of existing procedures. High-performance portals can lay the foundation for new public

agencies, push the internal networking, force the reorganization of the public sector, set new accents with centralization and decentralization concepts, as well as improve the citizen involvement. At the same time, they can reorganize the contact with citizens and customers, improve self-services, introduce new service delivery concepts, and start with pro-active services (Millard, Iversen, Kubicek, Westholm, & Cimander, 2004, pp. 27-45).

## CONCLUSION

Portals and high-performance portals offer a new, innovative concept for bundling information, services, products, and processes. Portal technologies open room for new public services and a broad reorganization of the public sector in general, which had been unrealistic in the past. Together they can make a significant contribution to the further modernization of government and public administration. Within the public sector there are many different portal types, which might be attractive for citizens, business, agencies, or government entities. While simple portals can be built in a short period, the development and the implementation of high-performance portals are much more complex and therefore will take a longer time and more financial means. Regarding the perspective and the potential benefits, it is definitely worth for any public sector institution to move on this way.

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## KEY TERMS

**Agency Portal:** Public sector portal that is designed around a certain agency or administrative unit, like a municipal office, an authority, a department, a ministry, a

public institute, a public corporation, or a public foundation. (Web-based example of an agency portal: http://www.whitehouse.gov)

**Audience Portal:** Public sector portal that bundles all the relevant information, services, processes, and points of contact for a special target group. (Web-based example of an audience portal: http://www.students.gov)

**Business Event Portal:** Public sector portal that bundles all the relevant information, services, processes, and points of contact around one or more business events of an enterprise. (Web-based example of a business event portal: http://www.basis.ie)

**Cross-Agency Portal:** Public sector portal that is planned, built, and operated jointly by several agencies. These portals try to bundle services from several agencies into one portal. (Web-based example of a cross-agency portal: http://www.fedstats.gov)

**Cross-Government Portal:** Public sector portal that is planned, built, and operated jointly by several government entities of the same (horizontal) level to realize synergy effects. These portals try to bundle services from several government entities into one portal. (Web-based example of a cross-government portal: http://www.acol.ca)

**Employee Portal:** Internal portal of a government agency for its employees, not open to the general public, planned, built, and operated by the internal information technology department. It might include an electronic desktop, an administration information portal, an intranet portal, and an employee self-service portal.

**Government Portal:** Public sector portal that is designed with regard to a certain government entity like the municipal government, the county government, the state government, the national government, or the supranational government. (Web-based example of a national government portal: http://www.belgium.be)

**Life Event Portal:** Public sector portal that bundles all the relevant information, services, processes, and points of contact around one or more life events of a citizen. (Web-based example of a life event portal: http://www.oasis.ie)

**Life Event Principle:** Classification principle that stands for the orientation of information, services, products, and processes toward target groups and toward their special requests in certain moments or phases of their life, from cradle to grave. In conjunction with citizens, these events are known as "life events" while for businesses the term "business event" is used.

**Portal:** Easy-to-use, secure, and personalizable access systems, with which users receive access to information, applications, processes, and persons which are available on the systems covered by the portal, with consideration to their respective access authorization. Access to the portal can take place according to the multichannel principle, via different media and access channels. Portals are therefore not restricted to Internet technologies while the so-called Web-based portals (Web portals) are focused on the World Wide Web.

**Public Sector Portal:** Easy-to-use, secure, and personalizable access systems with which users receive access to information, applications, processes, and persons from parliament, government, administration, justice, and public corporations. These are available on systems of the public sector which are covered by the portal, with consideration to their respective access authorization.

**Topic Portal:** Public sector portal that is arranged around certain topics or subjects with special reference to the public sector. (Web-based example of a topic portal: http://www.environment.gov.au)

**Vertical Cross-Government Portal:** Public sector portal that is planned, built, and operated jointly by several government entities of different (vertical) levels of government. These portals try to bundle services from several government entities into one portal. (Web-based example of a vertical cross-government portal: http://www.ch.ch)

# Postal Services and ICTs in Japan

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## INTRODUCTION

Postal service organization has a long history of exploiting ICTs in its business operation as a government ministry, then as a public corporation from April 2004. In the business world, ICTs play a central role of promoting operational efficiency and customer services as well as fostering new businesses for further development. The Japanese postal service organization will be privatized in October 2007 and privatized companies will be forced to make further use of ICTs.

In this article, the use of ICTs in the postal services will be described with a view to clarifying the relationship between the incentives of introducing ICTs and the institutional arrangements, namely a government ministry and a public corporation.

## BACKGROUND

The modern postal service was created by the national government in 1871. Three categories of services, namely postal delivery service, postal savings service, and postal life insurance service had been provided by the government (Ministry of Posts and Telecommunications, MPT) for about 130 years.

In the late 1950s, the government started its government-wide undertaking for the management reform of administrative affairs. Coincidently, the first computer in the national government was introduced by the Meteorological Agency in 1958. During the 1960s, improvement in the efficiency and efficacy of public administration were made through the use of computers (ECHMCA, 2001). Since 1960s, as one of the reform measures, MPT had been introducing ICTs into its postal service operation to improve the operational efficiency and customer services (MPT, 1972).

As a result of "Hashimoto Reform," the drastic restructuring of central ministries and agencies was conducted in January 2001. MPT and the other two ministerial-level organizations were merged to become the Ministry of Internal Affairs and Communications (Kaneko & Horie, 2000). At the same time, the unit in charge of conducting postal services was detached from the internal units of the ministry to become the Postal Services Agency, an external agency of the Ministry of Internal Affairs and Communications. Japan Post, a new public corporation, was established to carry out postal services in April 2003 as a successor to the Postal Services Agency.

The institutional arrangement of the Japanese postal services once was a ministry for more than 130 years and became a public corporation. In the following, the outcomes of the ICT strategies taken by MPT will be described. Then, on-going efforts by Japan Post will be mentioned in the future trends.

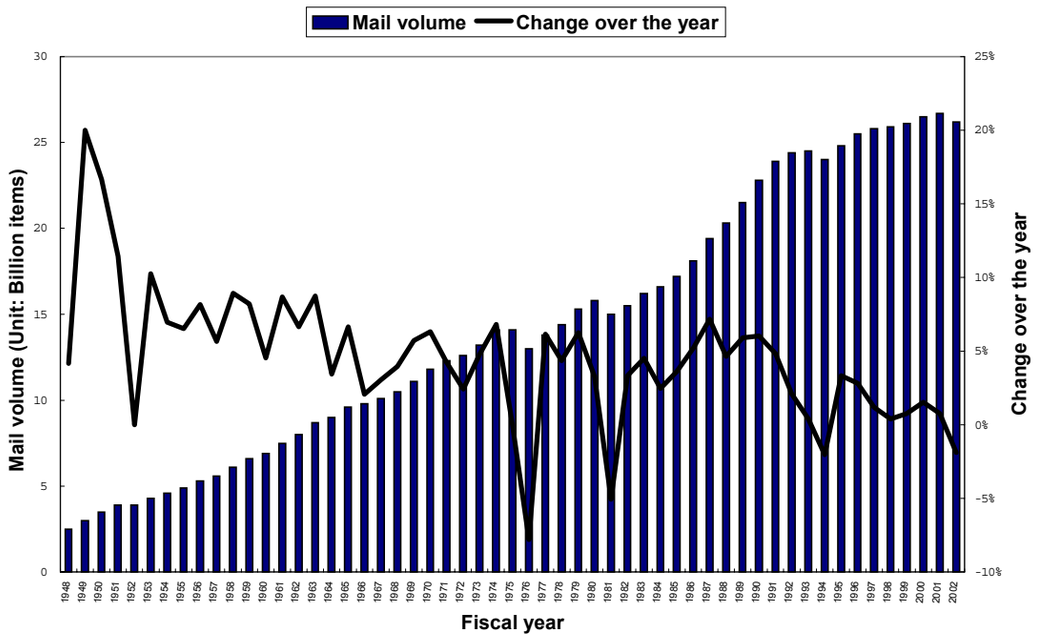
## ANALYTICAL FRAMEWORK

There are some theories concerning the use of new technologies in society. One of them is the technology acceptance model (TAM). TAM is an information systems theory that models how users come to accept and use a technology. The other prominent theory is the diffusion of innovation theory formalized by Everett Rogers (Rogers, 1995). Rogers stated that adopters of any new innovation or idea could be categorized as innovators, early adopters, early majority, late majority, and laggards, based on a bell curve. Each adopter's willingness and ability to adopt an innovation would depend on their awareness, interest, evaluation, trial, and adoption. Some of the characteristics of each category of adopter include:

- **Innovators:** Venturesome, educated, multiple information sources
- **Early Adopters:** Social leaders, popular, educated
- **Early Majority:** Deliberate, many informal social contacts
- **Late Majority:** Skeptical, traditional, lower socioeconomic status
- **Laggards:** Neighbors and friends are main info sources, fear of debt

The categorization of adopters in the diffusion of innovation theory is used in describing the use of ICTs in postal service operation in Japan. Japan Post provides transportation services and financial services. These two categories of activities are quite different so that two separate headings are set up to describe the ICT use in the postal services.

*Graph 1. Trends in mail volume 1948-2002 (MPT, 2000; Japan Post, 2004)*




## POSTAL DELIVERY SERVICE AND ICTS FROM 1960s TO 2003

### Business Outline of the Postal Delivery Service

The postal delivery service is by its very nature a transportation activity collecting mail and parcels posted in mailboxes or accepted at the post offices, sorting them according to where they are to be sent, transporting them to the delivery post offices nearest to the addressees and delivering them to the addressees themselves.

The total number of items mailed in fiscal 2003 stood at 25.6 billion. This number is almost the same as that of France (Japan Post, 2004). The volume of mail continued to grow from the 1950s through to the mid-1970s when the oil crises struck Japan which had a negative effect on the items sent. After that, the Japanese economy recovered and the volume of mail sent also began to increase steadily. In the early 1990s, the volume leveled off as results of the development of the Internet and the severe competition in the parcel delivery market.

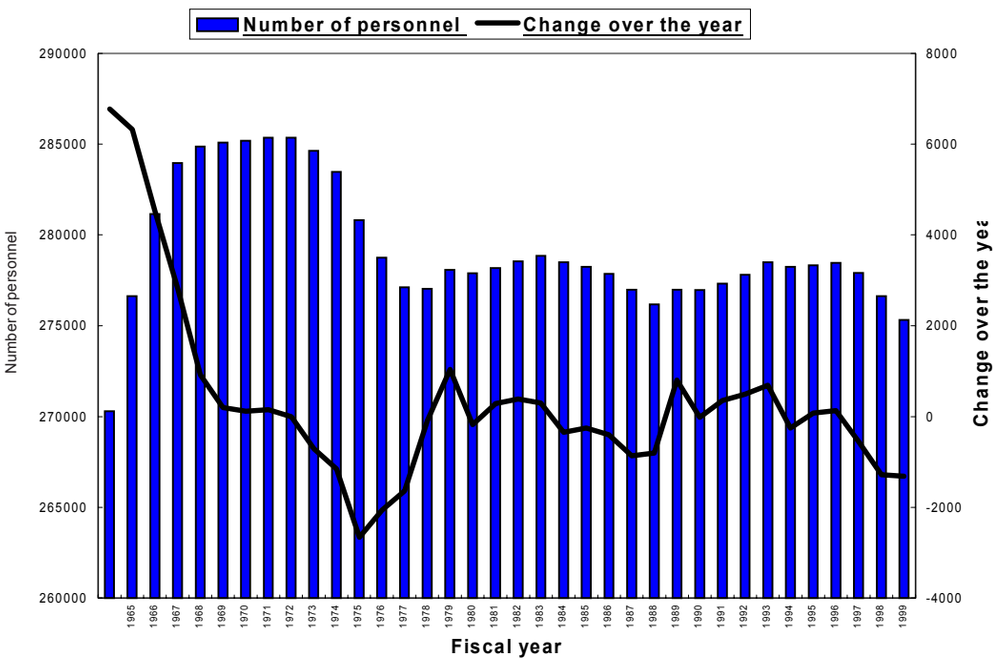
### Introduction of a Five-Digit Postal Code System

A five-digit postal code system was introduced in 1968. In this system, automatic postal code reading and sorting machines were installed in sorting mails according to the addresses. The machine was originally developed and custom-made for the use of MPT and was a product with advanced ICTs (MPT, 1972). It cost lots of money to develop the machine. At that time, there weren't any private transportation companies to introduce such machines in Japan. In this context, it can be said that MPT was an innovator in adopting ICTs according to the diffusion of innovation theory. The development of the machine served two purposes. One was to improve the operational efficiency of postal delivery service. The other was to promote the use of ICTs in society. MPT had dual roles. It was not only in charge of providing the general public with postal services but also responsible for policy-making and implementation in the ICT field. It seems that such dual nature promoted the introduction of ICTs in postal service operation.

Around 1960s, the mail volume continued to increase and a labor shortage was expected. This situation also forced MPT to introduce the automatic postal code reading and sorting machines in the postal delivery service. With this system, customers were requested to write five-digit postal codes as an appendage to addresses shown on mail.

Automatic postal code reading and sorting machines were put into operation in the post offices with collection and delivery functions. Many machines were installed even though their prices were relatively high.

*Graph 2. Trends in number of personnel in the post offices 1965-1999 (Organizational Chart of the Government of Japan, 1965-1999; Administrative Management Agency; Management and Coordination Agency)*




After the introduction of the five-digit postal code system, mail volume continued to increase by about five percent every year until 1975. At the same time, MPT could minimize the number of personnel required to deal with the increased mail volume. Before 1968, the annual net increase in the number of personnel was more than five thousand, but from 1969, that figure fell to about one hundred, a remarkable decrease. It can be said that introduction of the five-digit postal code system improved productivity and forestalled a demand for additional personnel.

## Introduction of a Seven-Digit Postal Code System

During the 1970s and 1980s, the mail volume steadily increased, except for in 1976 and 1981, when the oil crises occurred and plunged the Japanese economy into a deep recession. As a result of this recession, tax revenue decreased while the government spent its financial resources on measure to revive the economy. Consequently, the government incurred huge financial deficits in the early 1980s. In order to reconstruct public finances without increasing taxes, government-wide administrative reform efforts were initiated (Kaneko, 1996). Among these administrative reform measures, aggressive personnel reduction plans were decided on by the cabinet and MPT was forced to cut back its personnel even as the mail volume continued to increase. From around 1990, the rate of increase in mail volume fell to less than three percent, partly because of the development of the Internet and partly due to fierce competition in the parcel delivery market. The decrease of mail volume meant the decline of income from the postal delivery service.

Under such circumstances, further improvements in productivity and efficiency were needed. To cope with this challenge, the seven-digit postal code system was introduced in February 1998. Seven-digit postal codes are allocated to even smaller address areas than before, so that the reading and sorting machines can sort mail according to delivery routes. Before the introduction of seven-digit postal code system, postal workers sorted mail by hand, according to delivery routes. Such automatic mail sorting system according to the delivery routes was first introduced in the U.S. Japan is the second country to introduce the system. Only German, Singaporean and Dutch postal service agencies have introduced the same kind of system (H. Uchida, personal interview, October 14, 2005).

New reading and sorting machines were developed and installed to enable the seven-digit postal code system. One such machine reads zip codes and names of addressees, converts the read data into barcodes, which are then printed on the mail, reads barcodes, and re-

*Table 1. Workforce reductions and installation of new machines (Japan Post, 2003a)*

| Fiscal year | Cumulative full-time jobs eliminated | Jobs eliminated during the year | Number of new machines installed | Number of post offices with new machines |
|---|---|---|---|---|
| 1998 | 3,195 | 1,664 | 623 | 388 |
| 1999 | 4,610 | 1,415 | 727 | 458 |
| 2000 | 5,150 | 540 | 858 | 564 |
| 2001 | 5,693 | 543 | 1,000 | 674 |
| 2002 | 6,209 | 516 | 1,085 | 702 |

orders the mail according to the delivery route. Yet another machine uses OCR (optical character recognition) to read zip codes, names of addressees, barcodes, and sorts all larger mail measuring up to 40cm long, 30cm wide, and 3cm thick, and weighing up to 1kg (Japan Post, 2003a). The new machines were custom-made. Thanks to the development of ICTs and the introduction of competitive bidding, the initial average purchase cost of ¥280 million was down to ¥60 million in November 1999 and ¥30 million in July 2000 (T. Hama, personal interview, October 3, 2002).

The seven-digit postal code system enabled further reductions in the number of full-time jobs, resulting in the elimination of 6,209 jobs from fiscal 1998 to fiscal 2002 (Japan Post, 2003a).

## Major Issues in Introducing the Seven-Digit Postal Code System

By now, postal delivery service is going well along with the seven-digit postal code system. However, MPT encountered some obstacles in the early stage of the introduction. Major issues are described (H. Uchida, personal interview, October 14, 2005).

## Technical Instruction Tends to be Given Less than Needed

New machines were developed by the joint work by MPT head office and the contractors. At the time of installation, technical staff of the head office and the experts from the contractors usually visited the post offices to hold instruction and guidance sessions on the use of new machines. After the new machines were put in full operation, the head office has made it a rule for the technical staff to make a regular visit to the post offices to inspect the operation.

The instruction and guidance sessions as well as regular inspections had to be held during the midnight because the sorting of the collected mail is usually done during that time. This meant that simultaneous sessions or inspections were to be held at different post offices so that it was rather difficult to dispatch enough number of technical staff to respective post offices.

## Promoting the Use of Seven-Digit Postal Codes

MPT would not have made most of the seven-digit postal code system without seven-digit codes written on the mail surface. Therefore, MPT carried out several measures to promote the use of seven-digit codes. Roughly speaking, there were two approaches. One was to promote the use of seven-digit codes by the big business accounts and the other was to promote the use by the general public.

## Promotion Measures for the Big Business Accounts

Before full operation of seven-digit postal code system, MPT requested the big business accounts such as public utility companies sending massive mail of bills to change the postal code data stored in their customer information data-bases. In a usual case, these big accounts print the postal code and address of each customer on their billing mail by making use of their customer information data-bases. Additional work had to be done on the side of the big accounts. MPT introduced the discount postal charge system to be applicable to the accounts that print the seven-digit codes on their mail.

## Promotion Measures for the General Public

The next challenge was how to promote the use of seven-digit codes by the general public. In Japan, we have the custom of exchanging new year's cards. Persons who usually do not write letters or post cards write and send a lot of new year's cards around late-December. In introducing seven-digit code system, MPT held a public relation campaign of writing the postal codes of the senders on the new year's cards before the full operation of the system, in the autumn of 1997. As the senders of the new year's cards write their seven-digit codes on the cards, the receivers of the cards can write the seven-digit postal codes of the senders when they write letters next year. In using seven-digit codes, the customers can simplify the writing of the address. They can only write the names of the block and the street numbers together with seven-digit codes. Furthermore, original codes can be given to big business accounts and in this case customers need only to write the postal codes and names of addressees on the mail.

As results of these undertakings, 72.8% of the mail posted in the mailbox had seven-digit codes with them according to the survey conducted in 12 February 1998 (MPT, 1998). Further efforts were taken and the February 8, 2001 survey showed that 97.1% of all mail had seven-digit codes printed or written on them (Postal Services Agency, 2001).

## POSTAL FINANCIAL SERVICES AND ICTS FROM 1970S TO 2003

### Business Outline of the Postal Financial Services

MPT had been providing postal financial services (postal savings and postal life insurance services) from 1875. The postal savings special account and the postal life insurance special account were established separated from the general account of the government. Until April 2001, the funds deposited in the postal savings special account were compulsorily re-deposited to the Trust Fund Bureau of the Ministry of Finance. The funds were to invested or loaned to the public corporations and local governments based on the program decided by the parliament (Fiscal Investment and Loan Program, FILP). MPT could invest the insurance and annuity premiums deposited by the customers rather freely. In this sense, MPT was a financial institution with limited investment means (Japan Post, 2003b; MPT, 1972). After the FILP reform in April 2001, MPT could invest the money without restriction but a seven-year interim measure has been conducted. This is one of the reasons why the fairly large amounts of postal savings and insurance funds are invested in the government bonds.

The current Postal Savings Balance was ¥227.4 trillion and there were 75.8 million life insurance and annuity policies in force, with a total insured amount of ¥187,842 billion as of fiscal 2003 (Japan Post, 2004).

In the following, ICT use in the postal savings service is mentioned for reasons of space.

### Construction of Online Network

The use of ICTs in financial institutions began in the mid-1960s in Japan. Private financial institutions, especially banks, started to construct online computer networks together with various business operation systems in the headquarters, local branch offices, business centers etc., and to exchange data and information for greater efficiency in operation and labor saving. In the early 1970s, CDs began to be installed and ATMs took the places of CDs in the mid-1970s for enhancing customer services (FISC, 2005).

On the other hand, MPT was rather slow to construct its online system. MPT started to construct a computer networking system linking the headquarters, regional offices, business centers and post offices in the late 1970s, in order to improve customer services and streamline and modernize operations, keeping pace with the private banks. Online depositing and withdrawal services for ordinary savings started in1978. Services via ATMs began in 1981. The postal savings online network linking post offices throughout Japan was completed in 1984. This network system is one of the world's largest in the financial service field, connecting about 20,200 post offices and ATMs and CDs. The total number of ATMs and CDs is 26,483 as of fiscal 2003 (Japan Post, 2004).

According to the diffusion of innovation theory, in the financial service sector, the private banks can be identified as innovators in constructing online network for their business operations. On the other hand, MPT had willingness and ability to swiftly construct its online network for its postal savings service as a government ministry with responsibility of promoting the use of ICTs in society. However, an external circumstance as well as an internal condition forced MPT not to be an innovator of adopting ICTs (M. Aida, personal communication, October 18, 2005). As the external circumstance, there was the deep-rooted criticism from the private financial institutions. They denounced that MPT delivered the same kinds of financial services that the private sector could provide, hence ruined the business opportunities of the private sector. This circumstance hindered the advancement of ICT use in postal savings service. MPT was required to take a prudent step toward ICT introduction. The internal condition that hindered a swift construction of the online network was the vast number of post offices. Enormous investments were needed to construct online network connecting more than 20,000 post offices. In fact, it took more than five years to construct online network linking post offices throughout Japan (Japan Post, 2003b).

Because of these reasons, it can not be said that MPT was an innovator in constructing the online network together with the other operating systems. Rather MPT remained an early adopter in the early stage of ICT exploitation.

### Improvement of Customer Services by Collaboration with Private Banks

From the 1970s to the late 1990s, private banks continued to construct inter-bank networks and inter-industry networks for enhancing customer services and streamlining business operations (FISC, 2005). MPT had been ex-

cluded from these networks. After the economic bubble collapsed, the private banks became suffering from the non-performing loans. A lot of tax money was spent to rescue the banks with huge bad loans. More efficient business operation came to be needed in managing private banks. They started to close local branch offices. On the other hand, they were eager to increase the service delivery channels. Under these circumstances, MPT and some private banks agreed to connect their online networks to allow customers to withdraw cash from the bank accounts at the post office ATMs as well as from the postal savings accounts at the bank ATMs. This ATM/CD tie-up service was started in January 1999. After that, many banks sought to cooperate with MPT and as a result, the postal savings network was connected to 1,917 private financial institutions as of July 2003 (Japan Post, 2003b). In this context, MPT can be identified as an innovator in widening delivery channels by use of ICTs.

The debit card service was started in Japan in January 1999, involving the postal savings and seven other financial institutions as well as eight affiliated retail venders. This service enables cash-free payments for purchases made at retail outlets. 1,564 financial institutions and 223 companies participated in this service as of June 2003 (Japan Post, 2003b). In launching this service, MPT played a substantial coordinating role (M. Aida, personal communication, October 18, 2005). MPT should be identified as an innovator in this field.

The Multi-Payment Network is an online network to allow customers to pay their bills and taxes through counters, ATMs, cellular phones, and personal computers at any time and place. This network is regarded as one of the indispensable infrastructures for an electronic government. To construct this network, the Japan Multi-Payment Association was established in May 2000 involving major billing bodies and financial institutions including MPT. MPT was also in charge of realizing an electronic government; therefore it took the initiative of advancing the construction of the network. The services were started in October 2001. Postal Services Agency started multi-payment network services in January 2002 (Japan Post, 2003b). The postal savings organization has become an innovator and initiator in this field.

## Improving Operational Efficiency

By making use of advanced ICT in processing transactions, MPT had been improving the efficiency of its operations. Over the past ten years (fiscal 1993-2002), with a new transaction processing system, approximately 3,600 permanent positions were done away with while the number of transactions handled increased (Japan Post, 2003b).

# FUTURE TRENDS

From April 2003, MPT was transformed into Japan Post. Before the establishment of Japan Post, the establishment committee of Japan Post was organized to deliberate the medium-term management goals, management plan and other management standards. The committee suggested some crucial points to be taken into consideration in developing ICT systems under Japan Post (ECJP, 2002).

After Japan Post was established, strategies to exploit ICTs together with the restructuring of internal organizations were regarded indispensable to ensure the competitive edge of Japan Post as well as to support the corporate executives to decide overall management strategies. In order to implement this policy, some restructuring of internal organizations was conducted in July 2004. A new corporate ICT department was created and a new branch in charge of ICT matters for postal savings and life insurance services was established (Japan Post, 2003b; Japan Post, 2004).

The predecessor of Japan Post, Postal Services Agency was in its nature a unit inside a ministry and had to comply with the strict rules of the government organizations concerning personnel and financial management that are suitable for an internal organization of a ministry with policy planning functions. On the other hand, Japan Post is no longer an internal organization of a ministry, therefore more flexible rules of personnel and financial management can be applied. For example, a performance based pay system was introduced and the usual rule of preparing the budget on an annual basis has been relaxed. Such rule changing has affirmative effects on the introduction of ICTs (H. Uchida, personal interview, October 14, 2005).

In contracting out the system development, MPT often took private contracts with the specific companies. This was partly because the scale of the systems was too large for ordinary firms to accept orders and the substantial work periods were very limited due to the annual-based budget. After the corporatization, the principle of annual-based budget was relaxed and Japan Post can place orders extending several years. This measure lowered the risk bearing on the contractor's side; therefore the contracted prices were down greatly. Japan Post also made it a rule to take open bidding procedures and the procurement prices were decreased substantially (H. Uchida, personal interview, October 14, 2005).

Concerning the postal lobby, they ceased to explicitly submit demands after Japan Post was established with Mr. Ikuta, a prominent former CEO of a major marine company as its president. After the general election held in September 2005, more than half of the pro-postal candidates were defeated and now the postal lobby has lost their powers.

The Postal Service Privatization Law and other related laws were passed through the parliament in October 2005. Japan Post will be disbanded in October 2007 and split into four private entities, undertaking postal delivery, postal savings, postal life insurance and over-the-counter services under a private holding company (Kaneko, 2005). This means that the current operation systems should be divided among four companies. Business operation systems for the postal service company, the postal savings company, and the postal life insurance company may be relatively easy to reconstruct. On the other hand, lots of new business operation systems must be developed for the over-the-counter service company. Furthermore, the present corporate-wide operation systems of personnel, financial and account management must be divided into four parts, each corresponding to each company. These works must be completed by the end of September 2007.

## CONCLUSION

It seems that the institutional arrangements affected the level and range of ICT use in postal service operation. As a government ministry the Japanese postal service organization could introduce the most advanced ICTs in the monopolistic market, postal delivery market, but had to take prudent steps in the competitive market, the financial market for individual citizens. It can be identified as an innovator of ICT use in the postal delivery service. But it could not become an innovator in constructing computer networks for the postal savings service. After the online network was completed, it could be an innovator in collective undertakings of various actors in society for more convenient customer services and more efficient operation in the financial market. As a public corporation, Japan Post can develop its information systems more freely at less cost as strict legal restrictions for the government ministry were lifted. Thus, the institutional arrangements including legal regulations, organizational goals and management principles can affect the speed and extent of ICT introduction in an organization. Currently, business operation depends heavily upon its information system. Privatization and division of business involves the review of the whole system, the modification of existing systems and the development of new systems. Development of appropriate information systems is one of the key elements for the successful privatization of the postal services. How Japan Post will carry out these demanding works may show us the relationship between the ICT use and institutional arrangements of activities.

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## KEY TERMS

**Debit Card Service:** A service enabling the cash-free payment of purchases made at department stores, local shopping districts, convenience stores, gas stations, and travel agencies that are the members of the Japan Debit Card Promotion Association. This is done by withdrawing funds from the customer's postal savings account or bank account and depositing them into the vendor's account using a cash card.

**Japan Post:** A public corporation newly established in April 2003 based on the law. Its mission is to deliver universal postal services to the general public. This means that the citizen who lives in the most remote area can use the postal services. To carry out this mission, the post offices are located even in the scarcely populated areas.

**Ministry of Posts and Telecommunications:** A ministry established in 1886 when Japan adopted the Cabinet system. It was responsible for delivering postal services as well as implementing regulations in the telecommunication area and promoting the use of information and communication technologies in society. This ministry was combined with the Ministry of Home Affairs and the Management and Coordination Agency to make the Ministry of Internal Affairs and Communications in January 2001.

**Multi-Payment Network:** An online network linking between billing bodies (such as private companies, municipal entities and government offices) and financial institutions to allow customers to pay their bills and taxes through counters, ATMs, cellular phones and personal computers at any time and place. The Multi-Payment Network is regarded as one of the key infrastructures to realize an electronic government in Japan. The network service was started in October 2001. The service was widened in January 2004 with government offices and municipal entities participating. 1,361 financial institutions participated as of July 2005 and 42 billing bodies participated as of October 2005.

**Postal Code System:** A code system to be added for each address of mail or parcel. Each code is allocated to some address area. Customers are requested to write postal codes as an appendage to addresses shown on mail. In Japan, a five-digit code system was first introduced in 1968 and a seven-digit code system was introduced in 1998. In the processing and delivery of mail, the postal code written on mail is read by a machine and automatically sorted according to the code. This system not only enables sorting mail quickly and speeding its delivery, but also makes it possible to reduce the cost of mail sorting.

**Postal Services:** Three services that the Japanese postal service organization has been providing for more than 100 years. These are postal service, namely mail and parcel delivering service, postal savings service, namely providing depositories and money transfer services and postal life insurance service, namely selling convenient life insurance policies and annuities. There are three separate branches in the head office but the most of the post offices deal with three services in a merged way.

**Reading and Sorting Machine:** A machine to be used in the postal code system. It can read the postal code and automatically sort mail according to the address. This machine is put into operation in the post offices with collection and delivery functions. ICTs are utilized in the development of this machine. This machine was originally developed and custom-made for the use of the Ministry of Posts and Telecommunications.

# Problems of Offline Government in E-Serbia

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## INTRODUCTION

Various aspects of the Eastern European transition have been extensively researched over the past 15 years. Only recently, studies of democratization have begun to specifically recognize and reflect the context of the information age in which they are taking place. This claim particularly applies to the late and ongoing transitions in the Western Balkans along the new borders of Europe. The least researched aspect of their democratization refers to the modernization of their civil service, particularly through the lenses of the informatization (Frissen, Bekkers, Brussaard, Snellen, & Wolters, 1992) of their administrations and development of e-government as an important element of transparent governance. This is a gradual and uneven development, yet it initiates institutional change toward having friendlier administrations that were hardly conceived at the beginning of the transition.

## BACKGROUND

Recognizing the relevance of the external EU (European Union) framework in developing national e-government policies, this article departs from the question of how the informatization of administration affects late transitional societies in the building democratic governance. It specifically focuses on problems and actors' choices in pursuing domestic e-government policies in times of major strategic realignment from isolation to Euro-Atlantic integration: What explains the gap between aspirations, policy development, and implementation?

By definition, governments' pursuit of national information-society policies (NISPs) includes e-legislation, e-technologies, e-space, e-commerce and e-business, e-education and e-health, and last but not least e-government; it posits EU standards in the normative reforms of the candidate and aspirant states. NISPs build on technological, organizational, legal, and administrative innovations that profoundly change life in the spheres of work, politics and government, and society (Soete, 1996). We look at the case of Serbia and Montenegro because it exemplified a promising late starter among transitional countries in the region, but had experienced unforeseen problems along the way and failed to maintain the policy pace set by its neighbors. We also take Slovenia as a benchmarking success case as it is the only ex-Yugoslav country that became an EU member (in 2004) and achieved notable results in the building of the information society and functional electronic government. Many scholars think that information-society development in transitional societies positively contributes to the building of democratic governance and advancement toward consolidation because it enables the development of modernized, outward, transparent, and friendlier e-based administrations.

## ARGUMENT

This article argues that the state-led informatization of government may even slow down rather than accelerate the first stage of institutional development in late transitional societies because it increases the levels of transformational complexity. Investments in information society building may increase returns only if the top policy entrepreneurship is combined with deep techno-organizational overhaul of institutions, broad societal preparatory work, and the accumulation of the critical mass of new knowledge. Informatization rests on prior complex, vertical, and horizontal systemic and organizational change. This includes the most difficult aspects of soft reforms, that is, the strengthening of human capacity, serious learning, and attitudinal and cultural change. Such reforms cannot be fulfilled immediately after the breakdown of the old regime (particularly in competition with other state priorities). This is not linear, but a time-consuming, interchangeable process of substantive structural change where informatization creates cycles, stages, and instruments for the deepening of democracy and the advancement of citizen-centered governance.

## KEY EXPLANATORY FACTORS

a. External standards, internal contrasts: One country, two states
b. Regulatory framework: Complex requirements and leadership problems
c. Converging strategic areas: Public-administration reform, telecommunications reform, EU accession strategy, free access to public information
d. Paradoxes and missing points

## EXTERNAL STANDARDS, INTERNAL CONTRASTS

After more than a decade of wars, exclusion from virtually all international organizations, and the NATO (North Atlantic Treaty Organization) military intervention, Serbia and Montenegro became members of the South Eastern Europe Stability Pact (SEESP) and soon resumed the chairmanship of the Electronic SEE Initiative. Serbian envoys specifically lobbied to join this group. Europe was setting the pace of constant informational change, so its argument was that the Balkans (traditionally perceived as a turbulent region) cannot possibly reconnect and reduce the digital distance unless there was a mechanism that would allow institutional access to the activities the EU was undertaking. Through this electronic niche, a small group of national politicians of the new generation launched a spirit of genuine modernization and a sense of cooperation to this ever-troubling region. The comprehensive eSEE Agenda was adopted by all member states, and the goals and timelines were set. The agenda served as a mechanism to mirror the Lisbon documents and to transfer the activities undertaken by Europe (eEurope 2002, 2005; eEurope Plus Agenda and the G8 Okinawa Charter) on the Balkan non-member countries; they were to develop NISPs as basic platforms. However, 3 years later, all signatory countries developed such a document except Serbia. Why?

### One Country, Two States

Serbia and Montenegro are two federal units but technically two states; Serbia has over 10 million inhabitants while Montenegro has 620,000. With minimal joint functions and even different currencies, they lead separate policies in virtually all aspects of public life, including information-society development. In spite of the existence of the common international framework, eSEE, Serbia and Montenegro took separate paths in developing their NISPs. In the rush toward full state independence, Montenegro formally appeared more productive as it adopted its (lengthy) strategy in June 2004; however, subsequent normative work is stalled or duplicated, which is why controversies in Montenegrin ICT development call for a separate analysis. As an example, Montenegro could not automatically implement the Federal Law on Intellectual Property, but had to (re)write it as its own.

Serbia, which was perceived as a leader of the eSEE initiative, experienced a controversial development. Its late-reforming prime minister was the powerful motor force behind this experiment because he strongly believed that the e-based modernization of economy and society would pull Serbia out from the dark age and economic backwardness in a relatively short period of time. This is why no efforts were spared in this early period to put things in motion and get on information society tracks. This was a classical state-led, top-down initial push, with the presumption that the opening of the market with the basic positive regulation would take care of the rest. However, his tragic assassination in March 2003 interrupted this process and deeply destabilized the country. In this crisis, which led to early parliamentary elections and regime change, many of the reform processes were discontinued, while others, like informatization, lost priority. Only very recently, recognizing the country's international obligations, policy-development activities were revived with notable urgency. Public awareness about this is still very low and neglected.

## REGULATORY FRAMEWORK

Between 2000 and 2004, no single administrative law has been passed. Millions of donor money was spent and training was organized, but there were no results in the domain of adopted strategies, policies, and standards, let alone implementation. Some excellent drafts ended up on bureaucrats' shelves, while incidences of personal vanity got in the way of national informatization. It took the subsequent Serbian government another couple of years to start revisiting the national eSEE obligations and passing critical laws. Although the key strategic document, the National Strategy for Information Society Development, was planned for adoption by the end of 2005, it was long overdue and nowhere near adoption in mid-2006.

National action plans contained an extensive list of activities regarding the creation and implementation of legal infrastructures for IS in accordance with the Acquis Communitaire. This required the drafting and adoption of legislation on e-commerce and e-signatures, the ratification and implementation of conventions on cyber crime, and the protection of privacy and intellectual property rights by 2004's end. Ultimately, states were expected to establish benchmarking systems and national implementation mechanisms, starting with the formation of cabinet-level state bodies for the information society. For example, 3 years prior to entrance into the EU, Slovenia (in its capacity of the EU candidate) formed the Ministry for Information Society in 2001 to ensure leadership and policy coherence in this domain. Results were notable as next to Estonia, Slovenia was best rated among all candidate states (although its new government abolished the IS ministry). In Serbia and Montenegro, however, elites are still debating about the single best suitable institution for the national IS governance because the existing ones are inadequate and fragmented. Differences are more political than technical.

The primary research among policy actors shows their shared views on the key problems in getting the normative impediments out of the way: (a) the lack of institutional and human capacity of the state to lead and synchronize horizontal action in the areas of regulatory framing, (b) scarce resources and competing priorities (such as the Hague Tribunal and Kosovo) and the (temporary) loss of top political will to push for administrative modernization, and (c) the gap between the awareness of the few and the perception of the many. While some new statistics show that 20% of the population in Serbia used the Internet in 2005, other reports indicate that little has in fact changed singe 1997, when more than 40% of the population was functionally illiterate (i.e., have not finished elementary school) (Perazic & Belic, 1997). It is not just the issue of intrasocietal digital polarization; it is the mere ignorance and literacy divide. Poor access, meager population awareness, and poor (e-)literacy and democratic culture on the citizens' side, have to be addressed with the same attention as the administrative incapacity for significant e-development on the government side. This also suggests the soft areas in which policy attention should immediately concentrate if intentions about building information society are serious. Those are: modern primary and secondary education; specific administrative training, cheaper computers and access to high-speed Internet, and finally, general awareness raising. Without these groundworks, none of the high-policy promises made in the nice documents and laws make any sense and have no social value because the basis for their implementation is missing. As this preparatory work takes time, these points support the argument that informatization may slow down the process at this stage before the turnaround momentum of critical usage and exponential growth is reached.

## CONVERGING REFORM STRATEGIES

The *Public Administration Strategy* was one of the first official documents passed by the government of Serbia (in early 2005) that recognized the use of the Internet as the new medium that will enable citizens to directly access public information and interact with public offices (Ministry of Public Administration and Local Self Government of Serbia [MPSALG], 2006). The strategy rests on five principles: decentralization, depoliticization, professionalization, rationalization, and modernization; the latter is of immediate relevance to e-government development. The stated key objective of the public administration modernization is

*to enable citizens to exert influence on public life; this is envisaged through the introduction of information technologies into the work of public administration on both central and local levels. ICTs will enable full electronic accessibility of diversified services based on the principle of full transparency; this will also enable citizens to express publicly their attitudes towards the functioning of their public administration and carrying out of public assignments. Internet usage in this way, increases the role of (Serbian) public sector as a citizen-oriented service. The process of further democratization of the society is impossible without modernization and this is why these two sides must be carefully balanced and harmonized.*

This document recognizes the new reality of the information age in which the Serbian public sector promises to transform itself into a friendly e-based administration; however the implementation time span of 4 years (2004-2008) seems unrealistic given that the inherited administration is highly centralized, politicized, inward oriented, aloof, and perplexed. While the action plan seems very ambitious and focused on four main groups of activities—decentralization (four laws to be adopted by 2006), professionalization (10 laws and regulations in the pipeline), internal organization and modernization (assessment, change, electronization, and monitoring), and human resources management—the educational dimension seems inadequate. The reform period starts without a clearly designated educational center, academy, or institute that would be in charge for modern training and retraining. There are no updated, modern, standardized curricula, and what exists is donor driven and unsystematic. The PAR strategy recognizes this problem, but plans to form the training facility by 2006's end; this means that (in the ideal scenario) it could not be operational before 2007, which is too late for the pace envisaged by the strategic documents. Commonsense logic presumes a prior systematic production and employment of the new generation of professional and career civil servants so that they would constitute the input to the reform process, not the very last output.

The *Information Society Strategy* is one of the key converging documents that are still in preparation. Here, e-government is one of the areas in which rapid development is mandatory. In addition to special training for future e-literate professional civil servants, another critical element of the action plan is the enablement of online access to every school in Serbia. The fulfillment of this objective clearly requires coordination with reforms in the educational sector, which has not been systemically established as of yet. Currently, only universities and colleges in Serbia are connected to the Internet through the academic network, yet experts agree that for the exponential growth in the use of the Internet, it has to become accessible in every school. Montenegro has

already developed online access and a training plan for all 160 schools in that republic, and it is now working on the development of didactical software and teachers' training. The exponential growth in Slovenia, for example, happened when the first generations of ARNES (Scholarly and Academic Network) users matured and switched to the commercial use of the Internet for professional and other purposes outside the immediate educational realm. This was a huge leap in the number of users in Slovenia from 18% to 48% of the population in 4 years. The question is, could Serbia reach the same level of usage (nearly 50%) in a few years if it follows the same logic?

The *Telecommunications Strategy* is another crucial, yet missing document that should formulate the vision of the competitive telecommunications market in Serbia. How is this relevant for e-government? Without a strategic decision on the characteristics of the main government electronic network system, the creation and the functioning of integrated portals (particularly the standard delivery of e-government services with different levels of complexity) hasn't been possible. To avoid monopolization in the e-government affairs, Slovenia, for instance, developed the H-Kom, the state-managed network functional only for government purposes, not for commercial use. Another key element is the full coverage of the national territory with a digital signal, which is now only partially met (75% coverage; on related statistics, see Government of Serbia Statistical Office, 2006; *Internet World Stats*, 2006).

The *EU-Accession Strategy* was passed by the Serbian Parliament in early summer of 2005 as the first formal document that explicitly specifies the fields and the tasks on the country's way to EU membership. The first draft of this document had no word on e-government; only after the last minute intervention of experts and NGOs was this oversight corrected. Under the chapter on public-administration reform and modernization, this strategy now contains a section on the information society and e-government. From now on, it would be logical that these two groups of activities converge into an integral policy platform.

The Commissioner for Access to Public Information is a newly instituted, independent body that falls into the category of the keepers of democracy together with the Ombudsman. As it represents the instrument of public watch, it is an important institution that ensures the citizens' right to seek and obtain information from any government body that is financed with public money. This office was envisaged as the backbone of the future system of democratic governance, accessible (online and off-line), particularly minorities and underprivileged groups. Slovenia sees its commissioner as one of the most important information-society institutions and a powerful instrument of transparent democratic governance.

## PARADOXES

Judging by the normative and institutional dynamism, one would have to significantly lower information-society expectations in Serbia. This particularly refers to the Web-based contents and e-government services (G2G, G2B, and G2C) at all levels of complexity (information, interaction, transaction, and transformation). Between 2000 and 2005, most government institutions did develop Web sites. Business-to-business communication was, for instance, almost fully digitalized in 2003 (SMMRI, 2003). Also, around 30% of Serbian municipalities have developed partial e-services and continue to improve them and educate their staff through various decentralization programs supported by USAID, EAR, OSCE, and other donors (*Standing Conference on Towns and Municipalities of Serbia*). As a result, there is an incremental growth of G2C information and in some cases, interaction. There are hundreds of unsystematic, semi-interactive Web sites, growing in numbers as we move from top to bottom levels of government. Some of them offer open forums for citizens' comments to drafted laws (most of the republican ministerial sites), but the citizen's virtual engagement remains very low because of the still poor electronic awareness and computer literacy. Municipal governments sometimes provide electronic answers to citizen's inquiries in real time; however, this is an exception, not a standard. In most cases, services are still paper-based, off-line, and delivered by arrogant and incompetent staff, distant from the concept of the citizen-centered service. What can one make of this informational disorder?

Arguably, there is a positive side of the normative inertia: The state did not regulate the field because it fell short of the expertise, capacity, and techno-infrastructural means to do it; however, it did not prevent the donor-driven and homegrown bottom-up e-government activity that mushroomed in an attempt to modernize and upgrade the quality of the local life in Serbia. While there was no one to push the central government to get organized, there was no one to stop the local government from getting online. This is why there are e-government islands rather than a system. The number of domains doubled between 2003 and 2005 from 13,000 to 26,000. One could easily criticize the contents and the layouts of those Web sites because they are unsystematic and not very user friendly. However, given the total lack of a regulatory framework, no systematic training, no governing body, no

clear policy that would give direction in this field, and poor funding, it is a true miracle that even this quantum of content and service exists.

## MISSING POINTS

Local experts think that e-government cannot technically function as long as the integrated information system of the republican governmental bodies is missing. It should normally comprise three basic databases on (a) citizens, (b) firms, and (c) spatial information. These three databases configure the information infrastructure of the Republic of Serbia and now exist separately. All necessary information for the one-stop-shop services could be composed based on these three core groups of data. Until then, citizens will continue to be exposed to endless repetitive and costly procedures rather than have the state do the search of its own database for the information it already possesses. In the case of Slovenian development, one-stop-shop electronic service was the direct outcome of the enactment of Article 139 of the law on general administrative procedures: An administrative office must not seek the information from the citizen if it hast he retrieval capacity and access to that information through the back-office. While the combination of new rules and technology in Slovenia results in sparing seekers of government services from unnecessary hassle, Serbian citizens do not see those benefits yet.

Secondly, the fragmentation of the political system limits the potential effects of informatization on the quality of policy and governance. Sectors are not horizontally linked, and there is no systemic obligation for ministries to cooperate on lower levels of the policy process. Thus, instead of information sharing and value adding to ideas and initiatives, a silo system prevails. Without synergy in this domain, the use of information as a resource is limited while informatization seems superficial and technical rather than substantive.

The third missing element is the lack of a comprehensive educational and training system. Such a system would rely on facilities (training centers) that would produce new generations of professional career civil servants and policy makers. The fourth missing point is the normative system that would sensibly detect anomalies and paradoxes, cut the red tape, and spare the citizens from front-desk harassment and humiliation, loss of time, and undue process. There is no person, office, or body in charge to draw a typology of anomalies and regulatory paradoxes—from systemic laws to the lowest procedures—and in this way the country cannot begin to undo this vicious circle. Last but not least, no systematic tracking or research of Internet use, users' profiles, and preferences exists on the national level. The 2002 census omitted the question about the number of PCs in households. Some subsequent surveys now measure that but are still sporadic, market driven, and often contain conflicting data.

## SOME CONCEPTUAL PERSPECTIVES

We argued that informatization can even slow down the state-led e-based modernization of government because of the complexity of preconditions; it also creates instruments and conditions for the deepening of democracy. Space limitation reduces the following conceptual analysis to two debate groups: governance and new public management (Pierre & Peters, 2000), and agency-structure-function discourse (Giddens, Pierson, &Thelen, 2000; Lichbach & Zuckermann, 1997; Mahoney & Rueschemeyer, 2005). The first group of debates deals with internal and external reasons of administrative change, while the agency-structure-function debate looks at the unintended outcomes and increased returns of institutional change. How do they explain our case?

In the past 25 years, transitional scholarship has gone a long way from emphasizing national factors (O'Donnell & Schmitter, 1986) to recognizing the unpredictability of external environments in which major political overhaul takes place (Schmitter, 1996). The turn of the millennium marked more sophisticated approaches to transitional subjects, particularly in understanding the dynamism of Fourth Wave democratization (Whitehead, 1996) and administrative changes in the former Eastern Block. Students of postcommunist societies (Baker, 2002) conclude that public service can in itself be an instrument for, and of, democracy. New features of administrations for a democratic kind of governance are the professionalism of civil service, modernization, and competence rather than hierarchical dismissiveness to citizen needs. Baker illuminates our discourse by arguing that Fourth Wave transitional problems coupled with EU enlargement opened the way to the information-age type of solutions. What are these solutions?

In the recent study on the revitalization of public service, Snellen (as cited in Peters & Savoie, 2000) argues that, in spite of all risks involved (invasion of privacy, service depersonalization, lack of access), ICTs are recognized as core technologies of the 21st century public administration. Fundamental changes in these technologies are pervasive and will have a revolutionizing influence on the structure and the functioning of modern public administrations. ICTs already impact big and small

issues: legal issues in which automation enables the integration of multiple aspects of policy creation (decision-support platforms) with computer-generated policy implementation (such as welfare state), and local ones, in which local political agenda is empowered by the decentralizing features of ICT networks. Finally, on the individual level, change refers to street-level bureaucrats whose role vis-à-vis citizens will be replaced by one-stop-shops government portals that integrate the front and back offices and provide life-event services.

The end of the 20th century marked a paradigm shift in the mainstream public-administration literature from dominantly inward-oriented structural functionalism (Heady, 2001) toward a citizen-centered governance discourse (citizen as a subject, not an object of administration). Peters and Pierre (1998) highlight this debate, which centers on the question, Does the state have the capacity to continue to govern as in the past? While the new public-management literature delegitimizes the state in favor of the private sector, governance literature (Anttiroiko, 2004; Pierre & Peters, 2000) treats the state as not entirely impotent. It loses the capacity for direct control but exerts more influence instead. The capacity of government to coordinate, negotiate, and bargain becomes critical. This interaction is more network-like than top-down; interdependence (central-local levels) replaces hierarchy, while citizens are viewed as both users and stakeholders, that is, active participants and coproducers in the policy process.

The case of Serbian administrative and informational reform shows the opposite trend: The state has not yet developed any capacity to share the political space, build genuine partnerships, and engage in the governance process. It does not demonstrate the substantive opening and changing of attitudes; citizens are not aware of their changing position, infrastructure development is unsystematic, and sporadic electronization does not automatically revolutionize procedures but rather reinforces the existing anomalies. Clearly, imported laws and good intentions alone cannot do much about gaining a friendlier administration. Thus, at present, we can discuss Serbian democratic and electronic governance only in hypothetical terms.

Structural functionalists (Giddens & Lukes, 2000) and new institutionalists (Mahoney, Pierson, & Thelen, 2000) deal with the dilemma of unpredicted outcomes that the process of historical change may bring. Pierson (2000) focuses on the institutional reproduction and increased returns that history brings, but others argue that factors responsible for the rise of the institution may not be the same that sustain it over time. Institutional development does not preclude increased returns; that is, the beginning does not necessarily predict the outcome. Indeed, in the Serbian case, the beginning was ambitious and pushed by the prime minister and his expert government; the interruption was unexpected and it eventually led to the reversal of internal processes. Political paralysis paired with the loss of leadership and the weakness of the ICT business sector caused the state's subsequent inaction in regulating e-space. Yet, it also kept the state from interfering in the homegrown electronization of local governance that proved to be a useful disengagement. In spite of the initial institutional design by the EU standards for information-society development, historical events and official inertia altered the early development.

## FUTURE TRENDS

Serbian policy planners gave 3 to 4 years of time to the state administration to modernize and transform into a professional public service. Yet, the training facility that would produce new public servants ready to resume new roles was still nowhere in sight in mid-2006; some initiatives to build a Western-Balkan regional administrative center or academy under the EU patronage came up, yet without details and firm timelines. Given that wider popular understanding of e-government and the democratic potential of the Internet ranges from modest to insignificant, 3 to 4 years seem unrealistic to generate organizational, attitudinal, and cultural changes on both sides. The Stabilization and Association negotiations began in October 2005, with some national political hopes oriented in that direction. However, without urgent steps toward modernization, robust awareness raising, explicit and visible leadership, and credible commitment from the highest ranks of government, the idea of e-Serbia may remain off-line for some time.

## CONCLUSION

The capacity to implement policies is a true measure of consolidated reforms in transitional societies. Thanks to EU standards and foreign donor assistance in Serbia and Montenegro, modern state strategies are being developed without modern institutions to carry them through. Yet, when it comes to the implementation of policies, quality documents are not enough. Research shows that in Serbia, the dominant current approach to informatization looks more like superficial automation than the comprehensive systemic reform that cuts across institutional boundaries and enables meaningful and systematic exchange of information. Existing inward practices are being replicated rather than revolutionized, while information as such is not treated as a democratic and policy-planning resource. Malina (as cited in Hague & Loader, 1999) argues that the use of ICTs to democratize the activities

of the state is an ideal. ICTs will serve the cause of democratization only if a prior will for strong democracy is established. This is a critical point that highlights the contrast between the earlier period in Serbia and Montenegro in which this kind of will was clearly established, and the subsequent era where such deep changes in the mentality of governance did not find powerful-enough internal political recognition and leadership support.

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## KEY TERMS

**Consolidation:** This is a highly disputed concept that marks the end of the period of institutional instability in transition, and when democracy as a system of governance becomes safe from reversal. Linz and Stepan (1996) say that consolidation means that "democracy is the only game in town" and posit five criteria for measurement: developed civil society, political society, economic society (market), stateness, and the rule of law. Huntington's condition is the two turnover test, where there are two consecutive peaceful changes of democratically elected governments. Modern consolidated democracies increasingly build the sixth element information societies as technologically advanced modes of economic, political, and societal governance.

**Democratic Governance:** This is an advanced concept of democratic rule envisaged as an interactive relationship between state, society, and market, forwarded by the citizen-centered body of scholarship. Deep structural, organizational, administrative, and behavioral transformations make state and society interact more democratically through partnerships. Administrative definitions of governance (Peters & Pierre, 1998; Pierre & Peters, 2000) posit that the state loses the capacity for direct control but

exerts more influence instead. The capacity of government to coordinate, negotiate, and bargain becomes critical. This interaction is more network like than a top-down approach, and civil servants regain a long de-emphasized policy role. Their professionalism, attitudes, skills, and e-literacy become critical.

**Democratic Transition:** This is a complex process of regime change from authoritarianism and totalitarianism to democracy. The term democratic specifies the end toward which society and new institutions are developing, while transition refers to the movement or interval from one sociopolitical order to another. O'Donnell and Schmitter (1986) and Schmitter (1996) characterize it as a process of twists, turns, and paradoxes with high instability of institutions and overall governing conditions. The ongoing debate between structuralists and rationalists focuses on dominant driving forces of transition: Structuralists emphasize institutions as key determinants of change, while rationalists think that modern politics promotes agency as the equally important variable in shaping political outcomes. Thus far, technology has not been widely recognized as an equal force of democratic change.

**E-Governance:** While e-government focuses primarily on the provision of information and transaction-type service to citizens and businesses as customers, e-governance refers to the changing role of the citizen as a public actor and policy coproducer (Abramson & Morin, 2003). E-governance focuses on modernizing and transforming government to be able to engage in an innovative dialogue with citizens on policy and other open issues. It is growing into a backbone of democratic citizenship because it enables the individual to get mobilized and networked from home on selected priority issues, not necessarily someone else's agenda. In the 21st century, we witness a significant growth of e-government technology that will enable such advanced and complex interactions including e-voting. This concept may remain a techno-optimistic utopia in societies that work harder on infrastructural access than on the building of citizens' awareness and e-literacy. In some aspects, concepts of e-governance and information-society governance are increasingly converging.

**E-Government:** This is a concept of advanced organization and provision of government services based on the digital channels of communication and interaction between citizens, businesses, and state. It grew from the supply of Web-based information on government activities to highly complex transactions. Digital government does not automatically mean smart or friendly government. It only becomes such when policy makers become committed to the greater good of delivering better public services and information through digital or electronic means. The standard types of e-government services are G2G, G2B, and G2C; the levels of complexity differ from information and interaction to transaction and transformation. One-stop shops and life events are advanced services centered on the real needs of clients, customers, and citizens; their design is based on dominant demand patterns: building permits, emergency procedures, and the issuance of various documents and certificates. Here, the most important change is the 24-hour availability and accessibility of the self-service government with a single-window access point (Snellen, 1992; Vintar, Kunstelj, Decman, & Bercic, 2003).

**E-Government Measurement Criteria:** Europe's benchmarking criteria for e-government evolve and become more sophisticated rapidly (Electronic Intelligence Unit [EIU], 2004). They measure (a) connectivity, infrastructure, and Internet access; (b) the legal and business environment (laws that facilitate public- sector service delivery through electronic means); (c) educational skills (including e-specific); (d) government policy and vision; (e) the stage of e-democracy or e-governance, which is the employment of electronic means to promote public participation in governance; (f) the development of online service delivery for citizens and businesses; and (g) the existence of a functional cabinet-level governing institution.

**Friendly Administration:** Friendly administration serves the purpose of the participatory democracy. It is the motor force of democratic governance because it enables an advanced interaction of citizens and administration (which is presumably decentralized, professional, and modernized). Citizens are viewed as both users and stakeholders, that is, active participants and coproducers in the policy process; bureaucracy can no longer serve its own purpose, but has to transform into a competent and efficient service for the public. Legacies of authoritarian rule leave the heaviest heritage in administration. This is why the Fourth Wave transitional experience posits the reform of administrations as one of the critical preconditions for the overall democratization of society.

**Information Age:** According to some historians, the information age started with the discovery of print (Guttenberg); others argue that it began with the discovery of the telegraph (Samuel Morse in 1837) or the more advanced telephone (Bell) that marks the expansion of Western civilization since the 1850s. Most definitions, however, refer to the information revolution that erupted with the Internet. It is a term and concept applied to the period when the movement of information became faster than physical movement and culminated at the end of the

20th century. Information became not only a top commodity and a backbone of the knowledge-based economy, but an instrument of democratization and tremendous social change. In the last 10 years of global Internet use, the number of users went from 1 million to nearly 1 billion in 2005.

**Informational Policy Entrepreneurs:** Transitional politics in the information age opens space to new policy entrepreneurs. These people hold significant technomanagerial skills and ICT literacy, while being politically sophisticated and located close to power. They respond to the increasing demands for a more robust role of agency in national e-development because of the limited capacity of transitional structures to quickly adapt and manage complex internal and external changes. Rationalists define policy entrepreneurs as people (agents) who invest their resources in serious deliberation to push issues or "pet proposals" upward on the political agenda. They diffuse ideas as wide as possible to ensure widest visibility and are also responsible for pairing solutions to political problems (Kingdon, 1995). In postcommunist settings, informational entrepreneurs are very scarce and indispensable. They are either imported from the diaspora or temporarily supplied by donors to launch the process of rapid learning and attitudinal change. They meet fierce resistance from the parts of structure that will be most affected by modernization, professionalization, and rationalization.

**Information Society (IS):** European definitions view the information society as a society where low-cost information and transmission technologies are in general use. The use of information and data is accompanied by organizational, commercial, social, and legal innovations that will profoundly change life both in the world of work and in society generally (Soete, 1996). Progress in ITs and communications is changing the way we live, work, interact with government, and do business. Information (at the speed of light) is affecting the way people interact and is also requiring the traditional organizational structures including government to transform and be more flexible, participatory, and decentralized. In addition to e-government, the IS concept encompasses e-learning, e-health, e-legislation, e-business, e-infrastructure, and e-space.

**Informatization:** Economists view *informatization as the core transformative process of the information age, based on* the penetration of ICTs in all aspects of life and economy. Public-administration scholarship defines informatization as a set of complex developments, processes, and systems that affect public administration in a radical way (Frissen et al., 1992). It encompasses multiple elements: (a) the introduction of IT in shaping processes of automated information supply, (b) the (re)arrangement of flows of information for efficient supply, (c) the change of the organizational structure in which IT is introduced, (d) the development of specific information policy in organizations, and (e) the introduction of expertise and leadership in this field. The informatization of government is associated with four types of organizational rationality: political, legal, economic, and technoprofessional. Public administration is linked to all four types of rationality.

# Promoting Citizen Participation via Digital Government

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## INTRODUCTION

The advent of digital government unveils new opportunities in how government can address citizens' needs and requirements in innovative ways. One of the growing citizens' demands toward government today is the participation in policy making. This is reflected in a recent Organisation for Economic Co-operation and Development (OECD) (2001) report entitled *Citizens as Partners*, which concludes that "governments are under pressure to adopt a new approach to policy making—one which places greater emphasis on citizen involvement both upstream and downstream to decision-making" (p. 71). Digital government, enabled by information and communication technology (ICT), may help government in addressing such needs of citizens through network-based ICT applications.

ICT, particularly the Internet, may enhance citizen participation in several ways: By offering capabilities that transcend time and space limitations, ICT has the potential to overcome barriers of large-scale citizen participation. One of these barriers is the difficulty to achieve the desired level of face-to-face interaction during off-line participation (e.g., public meeting) (Adams, 2004). In off-line participation, citizens need to take turns to voice their opinions within a limited time frame. This often results in poor deliberation, a situation where the consequences of various policy options and views of others are not weighed carefully and sufficiently (Mathews, 1994). The mass communication and information exchange capabilities afforded by the Internet may be especially useful in enhancing participation of citizens in policy deliberation.

Despite the potential of ICT to enhance participation, it is vital to motivate citizens to participate. It is ironic that, while citizens increasingly demand for more participation, studies reveal that citizen participation has been declining in recent years (e.g., Lyons & Alexander, 2000). The paradox suggests that there is a need to investigate the factors that can lead to participation of citizens in policy making. Toward this end, we begin with a review of extant literature from political science to identify pertinent theories that may help explain citizen participation. As citizen participation via digital government is enabled by ICT, we also explore pertinent ICT features that may support participation.

## BACKGROUND

Citizen participation has long been one of the major research themes in political science. Several theoretical perspectives have been devised to elucidate antecedents of citizen participation in the offline context. Among the three widely employed perspectives are socioeconomic theories, rational choice theories, and social capital theories. We will discuss these theories in turn, and attempt to illuminate the links among them.

### Socioeconomic Theories

Socioeconomic theories are at root a sociological account of citizen participation (Parry, Moyser, & Day, 1992). This theoretical strand attempts to explain participation in terms of the individual's socioeconomic characteristics that shape his or her attitude toward participation. These characteristics include the individual's age, education level, and financial status. The socioeconomic theories (e.g., Verba & Nie, 1972) hold that individuals who are older, better educated, and wealthier are more likely to participate than those who are younger, less educated, and poorer. The logic is that an individual's advantaged socioeconomic characteristics would shape his favorable civic attitudes toward participation (Verba & Nie, 1972). While initial thinking along this perspective held that individuals with advantaged socioeconomic characteristics are more likely to participate, subsequent research questioned such propositions and the mechanisms behind the effects of socioeconomic factors (Verba, Schlozman, & Brady, 1995). Past studies have also shown that the general rise in education level does not necessar-

ily lead to increased electoral participation (e.g., Lyons & Alexander, 2000). These limitations have led to refinements in socioeconomic theories in terms of including a more comprehensive set of participation factors and the mechanisms linking individual's socioeconomic characteristics to participation.

Along this vein, Verba, Schlozman, and Brady (1995) developed the civic voluntarism model, which aims to specify "in detail how socio-economic position is linked to political activity" (p. 19). Cited as the most widely employed participation theory (Seyd, Whiteley, & Pattie, 2001), the model considers resources, motivations, and mobilization as antecedents of participation. Resources that include time, money, and civic skills bridge the individual's socioeconomic characteristics to their participation. In other words, individuals with better socioeconomic characteristics are more likely to participate because they possess the resources to do so. Motivations are conceptualized as individual and group incentives as well as a sense of political efficacy (Verba et al., 1995). Individual incentives include the ability to influence specific policies that an individual would like to see implemented, whereas group incentives include an individual's identification with a group (e.g., political party). Last, mobilization refers to the extent to which individuals are influenced by people around them to participate. Citizens may be persuaded by their friends or family members to, say, sign a petition or join a political party. Civic voluntarism model has been found to be considerably robust in explaining different types of political participation (e.g., voting, contacting authorities, and attending political meetings) (e.g., Pattie, Seyd, & Whiteley, 2003; Verba, Schlozman, & Brady, 1995). However, a limitation of the model is that it does not specify clearly the political institutions that may shape citizen participation (Rubenson, 2000). For instance, it may be useful to know whether existing political institutions support the formation of civic associations that generate mobilization, or whether there is an education system in place that promotes civic skills inculcation.

## Rational Choice Theories

Rational choice theories of participation see citizen participation as a rational activity to maximize benefits and minimize costs of participation (e.g., Olson, 1965). They propose that individuals are by nature economically rational actors, who base their decision to participate on cost–benefit calculation (Pattie, Seyd, & Whiteley, 2003). Benefits from participation include the ability to influence policy outcomes, whereas costs include the effort and financial resources required to participate. Additionally, the perceived benefits from participation are closely tied to one's political efficacy. In contrast to the socioeconomic perspective, rational choice theories consider the broad civic orientation of individuals of minor importance when compared to the benefits and costs of participation.

Rational choice theories have been criticized for not being able to explain electoral participation. In an election where many actors are involved, the likely influence that an individual has on the outcome, and thus the potential benefit, is extremely small. Considering the cost required to vote (e.g., time and effort), a truly rational actor may choose not to vote. However, we do see people participating in elections. Explanations have been offered in terms of the sufficiently low cost of voting (e.g., Verba, Schlozman, & Brady, 1995) that renders rational cost-benefit calculation unnecessary (Aldrich, 1993). This suggests that rational choice theories may be more appropriate for situations of participation where high potential benefits and costs are involved.

Arguing that the benefits for participation are too narrowly conceptualized in traditional rational choice theories, Seyd and Whiteley (2002) developed a general incentives model that incorporates incentives related to altruistic concerns and social norms. The resulting general incentives model encompasses five incentive types for participation: collective, selective, group, expressive, and social norms-derived incentives. Collective incentives are derived from policy goals that are available for all to enjoy regardless of whether one participates (e.g., tax reduction). This is in contrast to selective incentives that are restricted to participants, which include the gratification obtained during the participating process (e.g., enjoying interactions with others) and the privatized outcomes from participation (e.g., political career advancement). Selective incentives also include ideological incentives prompted by similar beliefs shared by members in a group. Group incentives and expressive incentives are related to individuals' attachment to a group (e.g., political party). Group incentives have to do with individuals' perception about the efficacy of the group as a whole to bring about desired social change, whereas expressive incentives are grounded in a sense of loyalty and affection to the group. Finally, social norms-derived incentives refer to the influence of other people on the individual's willingness to participate, and are similar to the concept of mobilization in the civic voluntarism model. The drawback of the general incentive model is that it does not consider the socioeconomic characteristics of an individual (e.g., education received) that shape the individual's civic attitude and skills toward politics. Another limitation of the model is its lack of consideration of the influence of political institutions on citizen participation.

## Social Capital Theories

Social capital theories (Coleman, 1988) are adapted to explain citizen participation from a social network perspective. This line of theories examines how network of ties and its features influence citizen participation. This signifies a departure from socioeconomic theories and rational choice theories whose focus is on individual-level antecedents of participation. One of the most widely cited works from this perspective is Putnam's (1993) study of Italian regional government.

The core concept of the theory, that is, social capital, refers to the connections among individuals that form networks of civic engagement, and the resulting norms of reciprocity and trust arising from the networks (Putnam, 1993). Social capital is intimately rooted in the associational life that exists within a community. Associational life is an outcome of civic engagement, or people's connection with the life of their community (Putnam, 1993). Instances of association life are having membership in hobby groups, neighborhood amenities, and charitable organizations. The main premise of this perspective is that a community with a rich associational life has a distinct advantage over a community with an impoverished associational life. As Putnam (1993) explains, "Civic associations contribute to the effectiveness and stability of democratic government … both because of their 'internal' effects on individual members and because of their 'external' effects on the wider policy. Internally, associations instill in their members habits of co-operation, solidarity and public spiritedness. … Externally … a dense network of secondary associations both embodies and contributes to effective social collaboration" (pp. 89-90). Features of social capital (norms of reciprocity and trust) also "reduce incentives to defect, reduce uncertainty, and provide models for future co-operation" (Putnam, 1993, p. 177). The existence of social capital, thus, may provide an environment favorable for citizen participation.

The social capital line of theories applied toward citizen participation has been criticized to suffer from tautological problems (e.g., Milner, 2002). It has been argued that the main factor posited to contribute to social capital production, that is, associational life, is also considered to be the socially desirable outcome of social capital. However, it should be noted that the associational life that contributes to social capital is nonpolitical in nature (e.g., citizen's taking part in hobby groups), whereas the favorable outcome is the political participation of citizens (e.g., voting). Since the direction of causality is from nonpolitical to political social capital, it does not constitute a serious tautological problem. Another criticism is that the theory does not consider the influence of individual's motives on participation (e.g., the benefits that one may obtain from participation). Even in the presence of social capital, individuals' intention to participate may be undermined if there is no attractive benefit to do so. Therefore, a combination of the different theoretical perspectives is likely to address the limitations of a single perspective.

## ICT and Citizen Participation

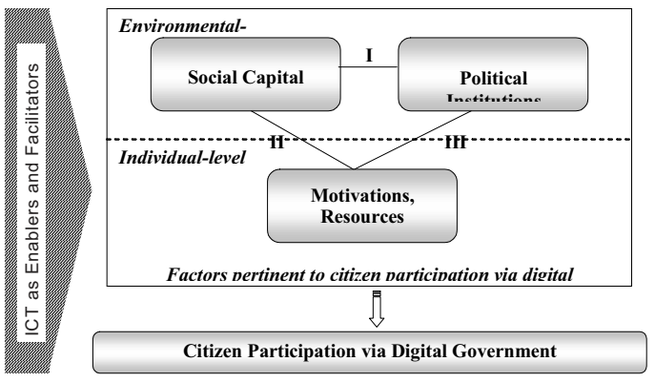
Political scientist Benjamin Barber (1998) claims that the most important question for future democracy is the meeting of ICT and democracy. ICT may support information and communication aspects that are both important to citizen participation. Citizens need various types of information in order to take active part in democratic processes (Wolfinger & Rosenstone, 1980). Through communication, citizens can broaden their understanding of a political issue by exchanging information, views, and feelings with other citizens (Gross, 2002).

Two ICT features may be particularly pertinent in supporting the information and communication aspects of citizen participation: communality and connectivity. Communality refers to the availability of a commonly accessible pool of information enabled by ICT (e.g., online forum) to all participants (Fulk, Flanagin, Kalman, Monge, & Ryan, 1996). Connectivity is the ability of ICT that enables individuals who share common goals and interests to easily communicate with each other (Fulk et al., 1996; Kumar & Benbasat, 2002). Previous literature has indicated connectivity and communality as two features of ICT that are germane in the context of collective action (Fulk et al., 1996). Communality helps to build up repositories of information that facilitate participant's access to relevant information. It also supports information exchange activities among participants that are vital to achieving policy deliberation. Connectivity, on the other hand, helps enable two-way communication between participants. ICT such as online forums and online chat record text messages posted in structured format along with the message poster. This allows individuals to easily identify other participants with similar goals and interests by directly observing their messages posted and responding to them.

# TOWARD A UNIFIED VIEW

An in-depth assessment of the off-line participation theories reveals the commonalities that they share as well as their complementary relationships, in that each of the theories is strong in certain aspects but lacking in others. An attempt at synthesizing the theories led to the identification of three classes of factors pertinent to citizen participation: motivations, resources, and social

*Figure 1. Framework of factors pertinent to citizen participation via digital government*




capital. The review of the theories also points to the need to consider political institutions. Figure 1 depicts our framework that integrates factors pertinent to citizen participation via digital government. Additionally, the framework also includes features of ICT as enablers and facilitators of citizen participation.

At the individual level, citizen participation may be determined by whether there are motivations for individuals to participate. These motivations are derived from the general incentives model and civic voluntarism model, and include collective, selective, group, expressive, mobilization/social norms-derived incentives, and a sense of political efficacy. Another class of individual-level antecedents to citizen participation is the resources possessed by individuals to participate. These factors are derived from the civic voluntarism model and consist of time, money, and civic skills. Beyond the individual-level factors, social capital and political institutions may also play a part in influencing citizen participation via digital government. Both classes of factors function at the environmental level. Social capital consists of networks of civic engagement, and norms of reciprocity and trust that exist in the community, whereas political institutions serve as the settings where political participation takes place.

The individual-level, social capital, and political institutions factors operate together to influence participation (Figure 1: links I, II, III). Political institutions that are supportive of civic association formation may encourage the development of strong networks of civic engagement (Figure 1: link I). A community with strong networks of civic engagement, where citizens actively participate in civic associations, exposes citizens to more political cues and opportunities (Rosenstone & Hansen, 1993). This makes them more likely targets of mobilization to participate (individual-level factor) (Figure 1: link II). Further, political institutions with an education system in place that promotes the shaping of individual's organizational and communications abilities may also help develop citizen's civic skills (another individual-level factor) (Rubenson, 2000) (Figure 1: link III).

## FUTURE TRENDS AND CONCLUSION

This article provides readers an integrative framework of factors that are pertinent to citizen participation via digital government. Features of ICT that may be particularly relevant to participation are also highlighted. The resulting framework (Figure 1) implies that future efforts to promote citizen participation via digital government should adopt a more holistic approach that takes into consideration the joint effects of individual-level factors (motivations, resources), environmental-level factors (social capital, political institutions), and ICT features on citizen participation. Accordingly, implementation strategies should be crafted in such a way that the different factors are carefully designed to attain citizen participation in a coherent manner, while exploiting the relevant features of ICT.

Some efforts are already headed in this direction. One notable example is community electronic networks, which provide citizens of a community (e.g., town, region) access to technologies (Internet, electronic mail, etc.), government information and contact of government officials, community services, and community-oriented discussion (Sullivan, Borgida, Jackson, Riedel, Oxendine, & Gangl, 2002). A well-known example of a community electronic network is Santa Monica's Public Electronic Network (PEN), which aims to promote citizens' access to technologies and foster a sense of community within Santa

Monica. In terms of political institutions, community electronic networks signify government's commitment to support and encourage civic activities with the help of ICT. Community electronic networks may also help in the development of social capital (Blanchard & Horan, 1998) through providing citizens an additional channel to interact with other members in the community.

Community electronic networks can be integrated into digital government efforts to create favorable conditions for citizen participation. Based on our framework (Figure 1), future efforts should exploit the positive impacts of community electronic networks (e.g., signification of supportive political institutions to citizens and increased social capital) by linking them more closely to the individual-level antecedents of participation. For instance, the community electronic network can serve as a platform to inculcate civic skills and generate mobilization of participation to citizens. ICT that offer connectivity and communality features (e.g., online forums) should be more fully tapped on to provide citizens with easier access to participation information and improve two-way communication for policy deliberation (Kumar & Vragov, 2005). Further, formal procedures for incorporating citizen's input into policy outcomes should be established to enhance attractiveness of participation incentives for citizens. Overall, our work serves to inform both theory and practice of how citizen participation via digital government can be enhanced.

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## KEY TERMS

**Civic Skill:** Individual's organizational and communications abilities that can facilitate his or her political activities.

**Collective Incentives:** Incentives derived from policy goals that are available for all to enjoy regardless of whether one participates.

**Communality:** The availability of a commonly accessible pool of information enabled by ICT to all participants.

**Connectivity:** Ability of ICT that enables individuals who share common goals and interests to easily communicate with each other.

**Expressive Incentives:** Incentives that are grounded in individual's sense of loyalty and affection to a group.

**Group Incentives:** Incentives prompted by individual's perception about the efficacy of a group as a whole to bring about desired social change.

**Political Efficacy:** Individual's perception that political change is possible, and that the individual citizen can play a part in bringing about this change.

**Political Institutions:** The settings where political participation takes place.

**Selective Incentives:** Incentives restricted to participants that include gratification obtained during the participating process, privatized outcomes from participation, and ideological incentives prompted by similar beliefs shared by members in a group.

**Social Capital:** Relational resources having to do with connections among individuals that form networks of civic engagement, and the resulting norms of reciprocity and trust arising from the networks.

**Social Norms-Derived Incentives:** Incentives for individual to conform to the influence of other people to participate.

# Protecting Citizen Privacy in Digital Government

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## INTRODUCTION

Protecting the privacy of citizens is a critical issue in digital government services. The right to privacy is widely recognized as a fundamental human right, as stated in Article 12 of the Universal Declaration of Human Rights (United Nations, 1948). The first definition of *privacy* was given by American lawyers Warren and Brandeis (1890), who defined it as "the right to be let alone." However, the right to privacy has been recognized for millenniums. The Hippocratic oath (n.d.) dates back to around 400 B.C. and instructs medical doctors to respect the privacy of their patients.

During the last three decades, many countries have passed privacy legislation, the Swedish Data Act from 1973 being the first national privacy act in the world. During the 1970s, many countries adopted data protection acts (Fischer-Hübner, 2001). In 1980, OECD published its privacy guidelines with the purpose of reducing the potential privacy problems incurred by cross-border trade (OECD, 1980). The European Council adopted Directive 95/46/EC in 1995, and all member states are required to implement national privacy legislation in compliance with this directive (European Union (EU) Directive 95/46/EC, 1995).

Privacy is under increasing pressure in the digital age, and the introduction of digital government services may escalate this development. The way government has been organized until now, with separate departments with their own "silos" of personal data, has inherently provided some privacy protection. In such a distributed environment data matching is expensive and resource consuming. This form of privacy protection is referred to as "practical obscurity" in Crompton (2004, p.12). Some examples of threats to privacy related to the development of digital government are as follows:

- Data collection capabilities increase as new technology for continuous and automatic data collection is introduced. Examples of such technologies include digital video surveillance, biometric identification and radio frequency identification (RFID).
- Data processing capabilities are rapidly increasing. The very existence of large amounts of stored personal data, together with the availability of sophisticated tools for analysis, increases the probability for misuse of data.
- There is a trend towards integration of formerly separated governmental services, including physical offices. Providing a single point of contact is more user friendly, but it may also provide an attacker with a single point of attack.
- Outsourcing of services (e.g., customer relationship management) is increasingly popular both among companies and governmental organizations. Those who deliver such services to many customers have a unique opportunity to gather personal information from many different sources. If services are outsourced across country borders, and perhaps in several layers, responsibilities soon become unclear.
- Even if the organization responsible for stored personal information does not have malicious intents, one cannot expect all its employees to be equally trustworthy. Disloyal employees are a severe threat when increasing amounts of information are stored.
- Tax records and other public records made available on the Internet enable efficient searches and aggregation of information about individuals. Identity thefts and fraud are common uses of information gathered in this way.

## BACKGROUND

Several aspects to privacy exist. Rosenberg (1992) identifies three: territorial privacy, privacy of the person and informational privacy. The main concern in digital government is *informational privacy*, which encompasses the control of collection, storage, processing and dis-

semination of personal data. *Personal data* is defined in EU Directive 95/46/EC (1995) as any information relating to an identified or identifiable natural person, referred to as the *data subject*.

One way to protect privacy is to focus on the individual and give each citizen tools to prevent personal data from spreading. Numerous services exist, for example, for anonymous surfing and e-mailing, and technologies for cookie management and encryption of communications. Such technologies, which give people a way to take direct control over their privacy, are important and their use should be supported whenever possible.

In the context of digital government, we choose to focus on organizations—in particular, governmental organizations—and how these can protect the privacy of the citizens whose data they process. That is, regardless of whether the individual chooses to use such technology as mentioned above to take control of his or her own privacy, how can organizations provide protection of citizen privacy?

Many government organizations have a legitimate need for collecting and using personal data in the provision of services. The right to privacy must, of course, be balanced against other rights and duties in society, but even so, governmental organizations should have a strong interest in protecting the privacy of citizens. The cost savings expected from introduction of digital government will not be realized unless a sufficient amount of citizens start using the new services, but citizens are less likely to start using new services that are not regarded socially acceptable. New services must, as a minimum, comply with legislation, but should also address the perceived threats they impose to be socially accepted.

To understand what privacy is really all about, one may start by studying the privacy principles that form the basis of modern privacy legislation in the EU member states and many other countries. In legislation, there are, of course, many exceptions to the general principles, but the intention of the legislation is to follow these principles to the extent possible. Table 1 discusses what in our opinion are the most important privacy principles.

An important issue in a discussion of privacy is against whom you need to protect the data. Against outsiders—that is, hackers and other attackers—you will use traditional information security measures. But insiders also constitute a serious threat. Insiders are employees or others with legal access to the systems who might use their access rights to misuse personal data, either on purpose or because they do not know better. Against this insider threat you need solutions to ensure enforcement of the privacy principles described in Table 1.

## PROTECTING CITIZEN PRIVACY

Government organizations need to take a structured approach in protecting the privacy of the citizens they serve. It is important to base one's actions on rational grounds. The converse approach—that is, ad-hoc collection and use of personal data—represents a severe threat to privacy.

*Table 1. Privacy principles*

| |
|---|
| • **Personal data should not be used for other purposes than those the data was collected for.** That is, the purpose of use of the data should be specified at the time of collection and should only be changed if the data subject consents. Enforcement of this principle is a major challenge, since common systems for access control do not take into account such properties as purpose and consent.<br>• **The amount of personal data collected and stored should be minimized.** Organizations should not collect more personal data than really necessary for the purpose and should delete data that are no longer necessary. In addition, they should, to the extent possible, reduce the identifiability of data; for example, by using pseudonyms.<br>• **The individual should be in control of his or her own privacy.** That is, he or she should be empowered to decide what is an adequate level of privacy weighed against the services he or she can get. Consent from the data subject is required if the law does not explicitly allow the data processing and, even more importantly, the data subject has a right to withdraw such consent at any time. Individuals have a right to be informed of which personal data exists, which purposes it is used for, who it may be transferred to and how it is secured. In addition, data subjects should have the possibility to demand correction or deletion of personal data.<br>• **Collectors and users of personal data are responsible for data quality.** That is, they have an obligation to ensure that the data is correct, up to date, complete and relevant for the purpose. Further, if errors are detected, they should take the steps necessary to minimize the damages caused for the data subjects—for instance, by distribution of incorrect information to others.<br>• **Adequate information security is a prerequisite.** An organization needs good technical solutions and operational routines to maintain security. In addition, an organization that transfers personal data to third parties must make sure that the receiver also has an adequate level of data protection. |

It is important that each government organization analyzes its need for personal data and the risks associated with their processing, so that adequate controls can be put into place to ensure a high level of privacy to citizens. A one-size-fits-all approach is not feasible, since organizations have different needs and risks associated with their processing of personal data.

An adequate level of information security forms the basis, but government organizations should take a number of additional steps to ensure proper privacy protection. These steps are addressed in the following subsections. Note that these steps are not necessarily conducted one after the other. Indeed, one would expect them to be carried out iteratively and often simultaneously.

## ANALYSIS OF DATA NEEDS AND PRIVACY RISKS

The first step is to analyze the organization's need for collecting personal data by answering the question of which personal data is needed for different purposes: in the provision of services, to comply with legislation and to ensure accountability.

Personal data collected merely to comply with legislation or to ensure accountability, and which are not needed to provide services to citizens, should never be accessed under normal circumstances. The need for personal data in day-to-day service provision should be further detailed by analyzing the needs of different users and by assessing the possibilities for using pseudonyms or less granular data. Ideally, users should not have access to more identifying data than is strictly necessary for the task at hand. One may, for instance, assess whether it is actually necessary for a user to know the identity, address or exact birth date of the person whose application or case is being treated. If not, one should deny access to such identifying data, or the data should be replaced with a pseudonym or less exact data; for example, birth year instead of full birth date.

The concept of pseudonymity is defined in Hansen and Pfitzmann (2005). Replacing a person's identity with a pseudonym enables linking of personal information in the domain where the pseudonym is valid without revealing the person's true identity. A person can be associated with many pseudonyms used in different domains. If the same pseudonym is used in too many domains, it may lose its value, because it might become possible to infer the true identity it corresponds to.

After analyzing data collection and usage practices, government organizations should analyze the risks of misuse associated with their collection and use of personal data. Examples of threats that may constitute risk include, among others, illicit profiling, disclosure of personal data to third parties and illicit access to personal data of known persons.

Privacy risk analysis is a special branch of the risk analysis field, and one that has drawn little attention so far in the research community. One exception is Zuccato (2003), who discusses the problem of measuring the value of information assets in privacy risk analysis.

The identified risks can be mitigated both by technological and procedural means. In this context, we focus mainly on technological means. In the next sections we discuss how privacy risks can be mitigated by designing countermeasures into applications and system infrastructure.

## DESIGN FOR PRIVACY

Designing for privacy encompasses the application of privacy-enhancing technologies (PETs) to address privacy requirements in system design. Privacy requirements arise from the need to mitigate identified privacy risks and to provide system support for ensuring that users do not have access to more data than is strictly necessary for the task at hand.

Privacy concerns should be addressed early in the system development process. A lesson can be learned from the security field, where it has been proven over time that security cannot be bolted onto an information system as an afterthought; it must be designed into it.

Government organizations should plan to move incrementally towards an information technology system consisting of applications and infrastructure integrating PETs while taking the installed base of legacy systems into consideration. To support this migration, organizations will benefit from establishing privacy functionality or services in their system infrastructure. Examples of such functionality are data quality assurance functionality, inventory systems for managing the personal data stored by the organization, systems that give access for data subjects to information about the personal data stored, privacy aware access control and audit tools (Arnesen & Danielsson, 2003).

As stated above, design for privacy encompasses the application of PETs, such as pseudonyms and pseudo domains (Hes & Borking, 2000), configurable granularity, client-controlled data (Wayner, 2004) and so forth, in system design.

Pseudo domains as a means to protect privacy have been proposed by Hes and Borking (2000). In each pseudo domain a data subject is identified by a unique pseudonym. Pseudo domains are motivated by the fact that some functions in an organization may not need to

have knowledge of information that directly identifies data subjects, typically the data subject's name or identity number. Some work can equally well be carried out when data subjects are identified by pseudonyms. Additionally, different functions can be provided with different pseudonyms for the same data subject, preventing unauthorized linking and matching of information.

Configurable granularity refers to system support for granting users access to different levels of granularity of personal data based on their need. For example, one user may need (and therefore, have access to) the full address, while another user may only need (and have access to) the postcode of the applicant while processing an application.

Client-controlled data refers to client-encrypted personal data where the client is in sole control of the encryption key. This technique can also be used to let the user of a service control the linkage between pseudonym and identity (Wayner, 2004).

Several projects have explored implementation of privacy in specific contexts. PISA[1] is one such example, exploring the use of PETs in the context of intelligent software agents, and Yu and Cysneiros (2002) discuss how to design for privacy and other competing requirements in multi-agent systems.

## POLICY SPECIFICATION

The privacy policy of an organization documents how personal data should be used by the organization, including who has access to which data and under what circumstances, and for how long personal data is retained before being deleted, or made anonymous and aggregated for further use as statistics.

The privacy policy of an organization reflects the maturity level of its data protection practices. At the first level, the privacy policy of the organization focuses on compliance with applicable data protection legislation, but the organization does not put much effort into analyzing its need for collecting and using personal data. At the second level, the organization has analyzed its need for personal data and enacted a policy it can enforce and that takes the need into account. In analyzing its need, the organization has also formulated a privacy goal/vision that it aspires to gradually move towards as it replaces its legacy systems with new privacy enhanced systems. At the third and last level, the organization allows its customers influence on which personal data are collected and how they are used.

Organizations should assure themselves that their collection and use of personal data is compliant with applicable data protection legislation. Some work has been done on assessment of privacy impact and compliance with privacy legislation. The Canadian Privacy Impact Assessment guidelines (Treasury Board of Canada Secretariat, 2002) and the Dutch Privacy Audit Framework (The Dutch Data Protection Authority, 2001) are notable examples of such work. They both provide means to identify weaknesses in the target system with relation to privacy legislation compliance. Furthermore, the EU project GUIDES[2] has produced guidelines to the EU privacy directive for e-businesses (GUIDES, 2002). The guidelines elucidate the legislation and give examples and best practices on how to ensure compliance with the legislation.

The privacy policy should be communicated both externally and internally; externally it works as a promise and internally it works as a basis for enforcement.

Examples of policy languages are Enterprise Privacy Authorization Language (EPAL) (Ashley, Hada, Karjoth, Powers & Schunter, 2003) and Platform for Privacy Preferences (P3P) (Cranor, Langheinrich, Marchiori, Presler-Marshall & Reagle, 2002). The policy may leave room for defining customer-specific policy rules based on each customer's preferences. A P3P Preference Exchange Language (APPEL) is a language for specifying personal preferences (Cranor, Langheinrich & Marchiori, 2002).

A prerequisite for enforceable privacy policies is the existence of ontologies or vocabularies that describe data categories, user roles, purposes of data access, conditions and obligations in a machine-understandable form. These vocabularies may be local or domain specific; for example, the health sector may adopt a common domain-specific vocabulary.

## ENFORCEMENT OF PRIVACY POLICY

Enforcement of privacy policy may encompass, among others, providing data subjects access to information about the data stored about them, ensuring data quality and that retention times are upheld, and controlling that personal data is only accessed in compliance with the privacy policy. A privacy policy may be breached both as an effect of acts with malicious intent and carelessness. Awareness building is important to limit carelessness by insiders. In many cases, technology can be used to provide automated enforcement.

Data quality can be ensured in many ways; for instance, by validating input according to defined rules, checking the data against other available registers or by encouraging the individual data subjects to access the information stored about themselves and making it easy to correct errors.

Another area where technology can be used is in controlling access to personal data. Organizations make a promise when collecting personal data. They have an obligation to see that the promise is upheld and personal data is not misused. Hence, the decision to allow access to personal data should not be up to the discretion of users. Instead, control of access to personal data should be mandatory, not discretionary. Access control should ensure, among others, that personal data is only accessed for the purposes that the data subject has consented to and ensure that any obligations incurred through the use of data are executed. An example of such an obligation is notifying the data subject of data access. Access control solutions are also necessary if fine-grained individual preferences are to be taken into account.

In addition to access control, technology support and processes for audit are important to detect privacy violations. Audit provides a safety net in case other security mechanisms fail. Audit is necessary to detect misuse through false statements of the purpose of data processing. Manual routines for inspection of logs, or more or less automated detection of privacy breaches through special privacy violation detectors should be implemented. In addition to an internal audit, enabling citizens to make extensive use of their right to information about their stored personal data and its usage may prove a powerful tool for control, as well as quality assurance and trust building.

## CONCLUSION

Government organizations should take a structured approach in protecting the privacy of citizens. Here we have given an outline of a number of steps that organizations should go through to facilitate this aim. In short, organizations should analyze their current collection and usage of personal data and evaluate the types and amount of data collected and used, whether the collection is "needed and worth it" and whether pseudonymized data or less granular data is sufficient. Additionally, organizations should analyze the risks of misuse associated with their data collection and usage practices. Furthermore, organizations should design for privacy. That is, they should incorporate PETs in their applications and system infrastructure. Finally, organizations should document their usage of personal data in a privacy policy and this policy should be enforced.

Government organizations have a moral responsibility to protect the privacy of citizens. An insufficient focus on privacy followed by a perceived erosion of privacy may result in an aversion among citizens to use new digital services and, as an end result, affect the legitimacy of government organizations. To hinder this development, it is important to take a proactive approach to privacy protection.

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## KEY TERMS

**Anonymity:** The state of being not identifiable within a set of subjects (Hansen & Pfitzmann, 2005).

**Data Subject:** The person to whom personal data pertains.

**Personal Data:** Any information relating to an identified or identifiable natural person (EU Directive 95/46/EC, 1995).

**Privacy-Enhancing Technologies (PET):** Technologies for protecting or facilitating the protection of personal data.

**Privacy Policy:** The privacy policy of an organization documents how personal data should be used by the organization, including who has access to which data and under what circumstances, and for how long personal data is retained before being deleted or made anonymous and aggregated for further use as statistics.

**Pseudo Domain:** A domain in which data subjects are identified by unique pseudonyms.

**Pseudonym:** An identifier of a person other than the person's true identity.

## ENDNOTES

1 http://icadc.cordis.lu/fep-cgi/srchidadb?ACTION=D&CALLER=PROJ_IST&QM_EP_RCN_A=53640

2 http://eprivacyforum.jrc.it/default/show.gx?Object.object_id=KM------0000000000000 2C8

# A Prototype Study on Electronic Rulemaking

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## INTRODUCTION

The making of government regulations represents an important communication between the government and citizens. During the process of rulemaking, government agencies are required to inform and to invite the public to review the proposed rules. Interested and affected citizens participate by submitting comments accordingly. Electronic rulemaking, or e-rulemaking in short, redefines this process of rule drafting and commenting to effectively involve the public in the making of regulations. The goal of the e-rulemaking initiative is to integrate agency operations and technology investments; for instance, the electronic media, such as the Internet, is used as the means to provide a better environment for the public to comment on proposed rules and regulations. Based on the review of the received public comments, government agencies revise the proposed rules.

With the proliferation of the Internet, it becomes a growing problem for government agencies to handle the comments submitted by the public. Large amounts of electronic data (i.e., the public comments) are easily generated, and they need to be reviewed and analyzed along with the drafted rules. As such, part of e-rulemaking involves a non-trivial task of sorting through a massive volume of electronically submitted textual comments. For example, the Federal Register (2003) documented a recent case where the U.S. Alcohol and Tobacco Tax and Trade Bureau (TTB) received over 14,000 comments in seven months, majority of which are e-mails, on a flavored malt beverages proposal. The call for public comments by the TTB included the following statement:

*All comments posted on our Web site will show the name of the commenter but will not show street addresses, telephone numbers, or e-mail addresses.* (2003, p. 67388)

However, due to the "unusually large number of comments received," the Bureau announced later that it is difficult to remove all street addresses, telephone numbers, and e-mail addresses "in a timely manner" (2003, p. 67388). Instead, concerned individuals are asked to submit a request for removal of address information as opposed to the original statement posted in the call for comments. The example shows that an effortless electronic comment submission process has turned into a huge data processing problem for government agencies. Fortunately, the advance in information and communication technology (ICT) can help alleviate some of the barriers in e-rulemaking. This article will discuss a prototype of a comment analysis system, which classifies public comments according to related provisions in the drafted regulations. The automated relatedness analysis system can potentially save rule makers significant amount of time in reviewing public comments in regard to different provisions in the drafted regulations.

## BACKGROUND

In the field of legal informatics, most research efforts focus on enhancing the search and browse aspect of legal corpus, whose targeted users are legal practitioners. Merkl and Schweighofer (1997) suggested that "[the] exploration of document archives may be supported by organizing the various documents into taxonomies or hierarchies that have been used by lawyers for centuries" (p. 465). Indeed, a hierarchical organization of relevant public comments and drafted provisions can extend the benefit to industry designers, planners, policy-makers and interested individuals as well.

Berman and Hafner (1989, p. 928) observed that legal rights of individuals are "severely compromised by the cost of legal services," and as a result suggested the potential of artificial intelligence (AI) to improve legal services. Rissland, Ashley, and Loui (2003) also noted that "the law offers structure and constraints that may enable AI techniques to handle law's complexity and diversity" (p. 6). Researchers have studied extensively the application of AI, in particular, knowledge-based systems, to the *understanding* of the law (Bench-Capon, 1991; Brüninghaus & Ashley, 2001; Schweighofer, Rauber, & Dittenbach, 2001; Thomson, Huntley, Belton, Li, & Friel, 2000; Valente & Breuker, 1995; Wahlgren, 1992). In

comparison, the application of ICT or AI to help the *making* of the law is rather new.

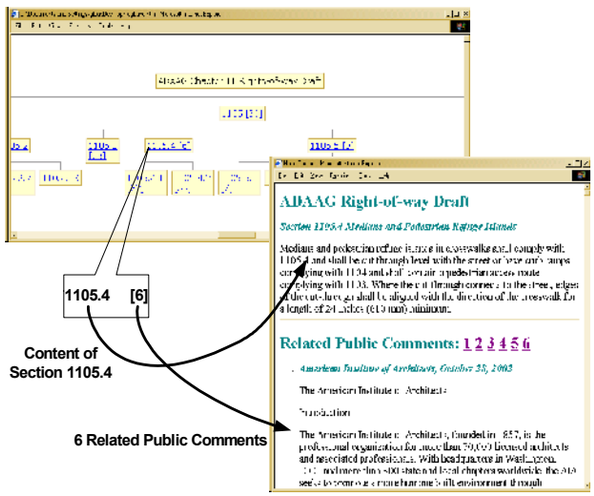
Nonetheless, ICT *can* help streamline the development of regulatory policy in several new directions (Coglianese, 2003). One suggestion is to integrate rules with other laws, such as using ICT to "link all the traces of a rule's history, both back to the underlying statute and back to past or related rules, facilitating improved understanding of legal requirements" (Coglianese, 2004, p. 88). Previous work has shown that such an application of ICT is indeed possible. A framework for comparisons among regulations from multiple sources has been developed, with successful examples of related provisions automatically linked (Lau, Law, & Wiederhold, 2003a, 2003b). This article will exploit the use of the developed comparison framework to implement a prototype to aid the e-rulemaking process.

## AUTOMATED ANALYSIS OF COMMENTS FROM E-RULEMAKING

In order to help screening and filtering of public comments, a prototype regulatory analysis system has been developed to automate the comparison between the drafted rules and their associated comments (Lau, Law, & Wiederhold, 2005). The prototyped e-rulemaking scenario incorporates public comments submitted to the U.S. Access Board, who released a drafted chapter for the Americans with Disabilities Act Accessibility Guidelines (Access Board, 1999), titled "Guidelines for Accessible Public Rights-of-way (Access Board, 2002)." The drafted chapter was less than 15 pages long. However, over a period of four months, the Board received over 1,400 public comments which totaled around 10 megabytes in size, with some comments longer than the draft itself. To facilitate understanding of the comments with reference to the draft, we have developed an automated system to perform a relatedness analysis.

Each piece of comment is compared with individual provisions from the draft. Characteristic features, such as conceptual phrases (Dörre, Gerstl, & Seiffert, 1999), are automatically extracted for the computation of the degree of similarity between provisions and comments (Bishop, 1995). The organizational structure of regulation is also exploited to review hidden relevance between neighboring provisions and references, similar to citation analysis and link analysis in the Web (Brin & Page, 1998; Garfield, 1995; Kleinberg, 1998; Page, Brin, Motwani, & Winograd, 1998). The results of this analysis are related pairs of provision from the draft and individual comment. Figure 1 shows the developed framework where users are given an overview of the draft along with related comments.

*Figure 1. Comparisons of drafted rules and public comments in e-rulemaking*




As shown in Figure 1, the drafted regulation appears in its natural tree structure with each node representing sections in the draft. Next to the section number on the node, for example, Section 1105.4, is a bracketed number that shows the number of related public comments identified. Users can follow the link to view the content of the selected section in addition to its retrieved relevant public comments. This prototype demonstrates the use of a regulatory comparison system on an e-rulemaking scenario to help review drafted rules based on a large pool of public comments.

To conceptualize the use of a comparison framework on e-rulemaking, we present some interesting results here. Figure 2 shows a typical pair of drafted section and excerpts of an identified related public comment. Section 1105.4.1 in the draft established the requirements for pedestrian refuge islands in situations where there lacks adequate signal timing for full crossing of traffic lanes. Using the prototyped system, we found that one of the reviewers complained about the same situation, where in the reviewer's own words, "walk lights that are so short in duration" should be investigated. This example illustrates that our system correctly retrieves related pairs of drafted section and public comment. We also observed from this example that a full content comparison between provisions and comments is necessary, since title phrases, such as "length" in this case, are not always illustrative of the content. Automation is clearly desirable, as it would otherwise require much human effort to conduct a full content comparison to sort through piles of comments.

*Figure 2. Related drafted rule and public comment*

**ADAAG Chapter 11: Rights-of-way Draft**

**Section 1105.4.1: Length**

Where **signal timing is inadequate for full crossing of all traffic lanes** or where the crossing is not signalized, cut-through medians and pedestrian refuge islands shall be 72 inches (1830 mm) minimum in length in the direction of pedestrian travel.

**Public Comment, October 29, 2002**

I am a member of The American Council of the Blind. I am writing to express my desire for the use of audible pedestrian traffic signals to become common practice. Traffic is becoming more and more complex, and many traffic signals are set up for the benefit of drivers rather than of pedestrians. This often means **walk lights that are so short in duration** that by the time a person who is blind realizes they have the light, the light has changed or is about to change, and they must wait …

*Figure 3. Comment intended for a single provision only*

**ADAAG Chapter 11: Rights-of-way Draft**

**1109.2 Parallel Parking Spaces**

An access aisle at least 60 inches (1525 mm) wide shall be provided at street level the full length of the parking space. The access aisle shall connect to a pedestrian access route serving the space. The access aisle shall not encroach on the vehicular travel lane. EXCEPTION: An access aisle is not required where the width of the sidewalk between the extension of the normal curb and boundary of the public right-of-way is less than 14 feet (4270 mm). When an access aisle is not provided, the parking space shall be located at the end of the block face.

**Public Comment, August 26, 2002**

1109.2 Parallel Parking Spaces. An access aisle at least 60 inches (1525 mm) …

1. **This section** needs to be clarified (i.e., where is the access isle located?) that is, "will it be on the driver side or passenger side?"

2. The following is more of a question/concern about this requirement: …

I would really appreciate, if you could **forward this comments to the right individual** and hopefully get a response back …

The pair of highly related provision and comment shown in Figure 3 suggests that a comparison between drafted provisions and comments is indeed the right approach. This commenter started by citing Section 1109.2 in the draft, followed by a list of suggestions and questions on Section 1109.2. Our system gathered the relatedness between Section 1109.2 and this comment through different features, such as the shared phrases. This piece of comment is a representative example of a lot of comments that are written similarly: comments that are concerned about a single provision in the draft. Thus, a comparison between drafted provisions and comments is important to help rule makers focus on the most related comments per provision.

## FUTURE TRENDS

Based on the observations of results shown in the previous section, there seem to be room for improvement for an e-rulemaking portal. The example in Figure 3 shows that the public might find it helpful to submit comments on a per provision basis, in addition to a per draft basis. With enabling technology, it should be possible to develop an online submission system that allows for both types of comment submission. It saves participants time to paraphrase or cite their concerned provision. It also saves rule makers time to locate related comments either through human effort or an automated system.

Comments submitted on a per draft basis can still be analyzed and compared with the entire draft to identify any additional relevant provisions. In the example of Figure 3, the commenter also suggested that it is important to forward the comments to the right person. An extension of this relatedness analysis framework could be developed to automatically inform any assigned personnel in charge of reviewing the provision within government agencies.

Regulations are frequently updated by agencies to reflect environmental changes and new policies. However, the desynchronized updating of regulations seems to be problematic, especially when different regulations reference one another. We observe that there is a need for consistency check among multiple sources of regulations citing each other as references. For instance, in the domain of accessibility, Balmer (2003) pointed out that the "ADAAG references the A17.1 elevator code for conformance. Since 2000 there has been no section of the A17 that references lifts for the disabled. Therefore ADAAG references a non-existent standard … if ADAAG is to reference the A18 then the A18 should contain the requirements for this application" (p. 10). In previous work, we have developed a semi-automated reference extraction parser, which can potentially be extended to locate cross citations and check for consistency of rulemaking (Kerrigan, 2003; Lau, 2004).

A public comment submission portal, an automated comment routing system and a reference tracking tool are just a few examples of the potential technology impact on the making of the law. E-rulemaking provides a rich research platform for a multi-disciplinary study involving social scientists, policy makers, computer scientists, and interested and affected citizens. Improvements and innovations of an integrated e-rulemaking system are much needed to help various parties to locate, retrieve, review, and validate regulations.

## CONCLUSION

This article has demonstrated a potential use of ICT on policy making, in particular, the communication between government agencies and the public via comments on proposed rules. A short discussion is given on the observed impact of e-rulemaking on the efficiency of government agencies. This translates into a significant increase of workload for rule makers, as the drafted rules need to be analyzed, compared, and revised based on the generated public comments. One of the main barriers to e-rulemaking, namely the vast amount of public comments received through the Internet, is concretized using a recent drafted regulation as an example. We proposed to perform a relatedness analysis on the drafted regulation and its associated public comments to streamline the process.

A prototype relatedness analysis system is demonstrated to compare a drafted regulation and its associated public comments. Documented and reported here are selected examples of results, which also inspired some potential future research directions. By screening through the public comments and sorting them according to their relatedness to provisions in the draft, it helps rule makers to review and revise the draft based on the comments. It helps interested and affected individuals to focus their concerns and suggestions to drafted rules. The use of ICT on the making of regulations can undoubtedly facilitate the editorial job of policy-makers and enhance public understanding of rulemaking.

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## KEY TERMS

**Academic Citation Analysis:** It is the analysis of the citation pattern among scholar publications and literatures. For instance, CiteSeer is a scientific literature digital library that provides academic publications indexed with their citations (Bollacker, Lawrence, & Giles, 1998).

**Characteristic Feature:** Features are the evidences that identify relatedness. Examples include conceptual phrases such as "access aisle," and domain-specific terminologies such as chemical names and symbols. Often, features are constructed by hand based on some understanding of the particular problem being tackled (Bishop, 1995).

**E-Rulemaking:** During the process of rulemaking, government agencies are required to inform and to invite the public to review a proposed rule. E-rulemaking redefines this process in which the electronic media, such as the Internet, is used to provide a better environment for the public to locate, retrieve and comment on proposed rules.

**Feature Extraction:** Feature extraction is an important step in repository development when the data is voluminous. In particular, in the field of information retrieval (IR), software tools exist to fulfill the task of feature extraction to recognize and classify significant vocabulary items (Bishop, 1995).

**Link Analysis:** The popularity of the Internet has led to extensive examinations of different types of hyperlink topology and fitting models (Calado, Ribeiro-Neto, Ziviani, Moura, & Silva, 2003; Gurrin & Smeaton, 1999; Silva, Ribeiro-Neto, Calado, Moura, & Ziviani, 2000). Google's PageRank algorithm (Brin & Page, 1998; Page, Brin, Motwani, & Winograd, 1998) and the HITS (Hypertext Induced Topic Search) algorithm (Kleinberg, 1998) both exploit the hyperlink structures of the Web, similar to the heavy cross-references in the legal domain.

**Relatedness Analysis:** A comparative analysis among regulations and supplementary documents that identifies similar or related materials by computing a similarity score. Although the term relatedness appears more appropriate, the phrase "similarity score" has been used in the field of Information Retrieval (IR) traditionally.

**Similarity/Relatedness:** Psychologists Gentner and Markman (1997) suggested that "similarity is like analogy (p. 45)," based on the concept of analogy defined by Johannes Kepler (1609/1992). In the comparative analysis of regulatory documents, we define similarity/relatedness to describe elements of texts that are alike in substance and/or connected by reason of a discoverable relation.

# Public Authorities and the Local Information Society

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## INTRODUCTION

This article focuses on the role of public authorities in the creation of local information societies (LIS). The analysis is conducted with reference to strategies, policies, and actions of public authorities with the aim of promoting information and communication technologies (ICTs) at the local level. Although the article relates to broad issues relevant today throughout the western world, we narrow the empirical examples to Finland.

To begin, we provide a brief account of documents that guide LIS policies. Our focus is on the *discursive* formation and *strategic* guidance of LIS. For example, several European Commission documents highlight the positive relationship between economic growth, competitiveness, and knowledge-intensity as a means for success in global competition. On the national level, we discuss the current Finnish government strategy for the promotion of the information society (Government of Finland, 2003).

Second, we offer insights into how discursive strategies for the LIS are implemented through *practical* activities. Two examples discuss the relationship between public authorities and citizen, business and governance-oriented LIS. In particular, it is essential to consider the connections and disparities between written policy strategies and everyday practices. The first topic focuses on the Tampere Region, recounting a case of LIS promotion through enhancing interaction between citizens and public authorities. In the second case, we discuss the Multipolis technology network. It is an example of LIS policy targeted to support private-led technology development in the more remote localities of northern Finland.

## BACKGROUND

Information, technology and knowledge and their production, transformation, and distribution have become part of our daily lives. Consequently, everyday language has incorporated new concepts such as information society (IS) and knowledge (based) society (KS). The former adopts the progress of technology as the core question, whereas the latter focuses on promoting the capabilities of citizens through learning, knowledge creation, and creativity (e.g., Florida, 2002).

The IS and KS, in their particularities, have been addressed by several scholars (e.g., Castells, 1996; Kellerman, 2003; Mansell & Wehn, 1998; Mitchell, 2000; Schienstock, 2004; Simmie, 2001; Webster, 2004). The roots of the IS are connected to market economy and growth. The majority of theories[1] on the IS highlight global competition, circulation of capital and flexibility in locating economic activities. Where IS researchers tend to observe societal issues from a macro perspective with a strong technical emphasis, their KS-oriented colleagues prefer to concentrate on the intertwined relations between innovation processes, technological development in organisations, and the significance of information as a fundamental element in knowledge creation. Colloquial use of the term information society has deflated the concept through the attribution of a wide variety of meanings and responsibilities. In this article, we use the term (L)IS to refer to the contents suggested by both IS and KS. Conceptually, IS and KS are analysed profoundly in other articles in this volume.

Our key interest lies in the local conditions and actions promoting both economic and social dimensions of the IS. In LIS practices, the significance of "local" is commonly narrowed to the level of municipalities. However, exclusive focusing on municipality as the spatial category for local disregards the position of LIS as a process with an active presence beyond the local. Therefore, we highlight the processes of LIS formation and how the IS, present at different spatial scales, transforms and transfigures local realities (see LIS definition at the end of the article).

We argue that public authorities discursively create a flexible definition of the information society in which ICTs play a fundamental role. Public authorities are mostly responsible for the continuous presence of IS in the

media, at least in Finland. In fact, Finland is a case of particular interest due to the "Nokia syndrome" plaguing the national IS discourse. As a result of the production and rapid proliferation of wireless technology, Finland was taken off guard by its new position at the top of the global information society (World Economic Forum, 2003). Public authorities were happy to accept credit for this fluent conversion from a traditional industrial society to an information society. Retrospectively, they claimed a causal relationship between the emergence of the IS and public investment in education, research and development in particular technological fields (Miettinen, 2002).

In the 1990s public authorities began to actively promote the IS as the key economic strategy for Finland. Castells and Himanen (2002) represented Finland as an example of a socially coherent and welfare-oriented IS with high level of social security. However, during the early 2000s, the growth of the ICT production and development sector has slowed down in Finland and the attraction of the "Finnish model for the information society" has waned somewhat. In everyday life, the penetration of ICTs and especially their active use has not increased as expected (ITU, 2005).[2] Nevertheless—or perhaps consequently—public authorities stress the significance of the technologies themselves in the promotion of LIS.

## STRATEGIES AS DIRECTIVES FOR IS DEVELOPMENT

On the global scale, the IS became a top priority in public policy in the early 1990s, when the US government published its *National Information Infrastructure* report (NII, 1993). Almost simultaneously, the "Bangemann" report was published highlighting the essential role of technology for the competitiveness of the European Union (European Commission, 1993). The strategy guideline reports of these two economic superpowers were followed by various national IS or "technology-driven" growth strategies. In Finland, the lead up to the current IS strategy began in 1994 with the publication of the TIKAS report by the Ministry of Finance. Soon after regional authorities started to produce their own IS strategies.

There are several possible ways to approach IS strategies. The first challenge is to define the appropriate spatial scale. There exists a vast amount of data concerning ICT-related indicators on the national and regional level of the European Union. However, such data on the spatial diffusion of ICTs and related infrastructure is rough and only describes certain technical prerequisites of IS. The rapid diffusion of continuously changing devices has the consequence that such data rapidly becomes outdated. A comprehensive comparative analysis of the presence of ICTs in the localities of EU-25 would require enormous effort. Furthermore, such extensive description would not be sufficient, as ICTs and their usage cannot be observed exclusively as technological phenomena: they are strongly influenced by the social context. For this reason, in the present study we choose to concentrate on Finland and describe findings in the practical promotion of LIS.

The Information Society Programme[3] is one of the four major policy programmes adopted by present Finnish government. In this way, concerns relating to IS development concerns are addressed on the same level as issues regarding employment, entrepreneurship, and public participation policy, which constitute the other three programme dimensions. In certain innovation policies and programmes, contacts between the public and the private sector are frequent (Lemola, 2003). Yet, the significance and substance of a general IS policy programme in Finland has been questioned. For example, in autumn 2004 a director of a major ICT-company gave a statement that co-operation between public IS policies and private enterprises in Finland is currently "more or less non-existent" and that the national IS Programme is but a collection of fancy ideas and words with no concrete substance that might induce co-operative action.

The regionalisation of IS in Finland occurs in a number of different ways. One significant regional policy tool is the Centre of Expertise Programme initiated in 1994. The mission of the current 22 centres around Finland is to make use of international high-level knowledge and competence for entrepreneurial activities, to improve the regions' development resources, and to create new employment opportunities. The local centres aim to improve the basic conditions for new innovations, product development, and commercial activities (Centre of Expertise Programme, 2004). Several centres focus on technology improving the competitiveness of technology firms in private technology parks.

As described, the fundamental goals of IS strategies are very similar on the EU, national and regional levels: the main components generally consist of economic competitiveness, regional equality and improved social life of citizens enhanced by the usage and implementation of ICTs. In Finland, local and regional authorities state similar goals in their regional and local IS strategies. The aims of regional authorities can be observed through a three-way categorisation based on their primary object of interest: the *citizen*, *business,* and *governance*-oriented IS (Table 1).

We use the above categorisation in our analysis of two LIS cases. The first case concerns the Tampere Region (Pirkanmaa), which is the second largest functional area in Finland, the largest being the capital area (Helsinki region, Uusimaa). The second case observes localities in the area covering the northern half of Finland

*Table 1. Categories for LIS target groups*

| |
|---|
| **Citizen-Oriented LIS:** The aim is to promote the use of ICTs by improving the computer literacy of the population and providing households with technical facilities such as broadband connection. However, the strategies of Finnish public authorities are often too broad and rarely provide clear guidelines for obtaining the goals |
| **Business-Oriented LIS:** The aim is to increase the national (and regional) competitiveness in technology and this way to contribute to the national economy. The total turnover of high-tech firms in Finland is larger than that of medium-tech enterprises (Statistics Finland, 2004). However, the distinction between high, medium and low technology enterprises is not clear. The national statistics have a tendency to label a relatively large portion of activities as high-tech, which may cause some distortion in the number of "knowledge intensive" industries |
| **Governance-Oriented LIS:** The aim is to improve the necessary institutional relations between authorities and citizens and to enhance the use ICTs to facilitate and accelerate the processes of enhancing e-democracy and e-governance. This can also be a step forward in transparency of governance. Despite the strategies, a systematic breakthrough in fast and interactive use of ICT in public services has yet to occur in Finland. |

with the city of Oulu as its functional centre. The citizen- and governance-oriented examples are from Tampere and the business-oriented example from Oulu. The cities of Tampere and Oulu have been named among the ICT hotspots of Europe (e.g., ESPON, 2004). Relevant information on the areas is available in: <http://www.pirkanmaa.fi/english/> and <www.multipolis.com>.

## EXAMPLES OF LIS ACTIVITIES IN FINLAND

### Public Service Provision to Citizens

The first empirical example concerns the eTampere[4] programme, an extensive (in terms of funding and number of development activities) LIS development project in Finland. eTampere is a network organisation. The projects under "the eTampere umbrella" are conducted through institutional organisations operating in the fields of technological development and research, local business promotion, e-business research and citizens' service provision.

The role of the public authority, the city of Tampere, is to provide seed funding for the whole eTampere network and to offer easy-to-use e-services for citizens. In the service provision, the aim is to introduce new ICT-mediated practices for citizens' communication with public officials and to integrate more citizens into the LIS. Several initiatives have been launched to promote e-inclusion. These include the eTampere smart card, the Internet bus, improvements in the city's Web and educational services produced in co-operation with various education providers.

A city Web site can be defined as the user interface through which the ordinary citizen can interact with public officials and gain relevant information on the city. The Tampere Web site fulfils many of the functions (information provision, interaction, feedback and electronic transaction) pointed out in the volume edited by Anttiroiko, Mälkiä, and Savolainen (2004) regarding online services. In this regard, e-services in the City of Tampere are rather highly developed in terms of information provision, interaction, and feedback. The main challenge still lies in enabling online transactions for the whole range of communication between citizens and public administration.

It is important to highlight the role of education in the LIS development. The eTampere programme provides educational services to citizens. The services are designed for different target groups including the elderly and disabled persons. The educational services have proved very popular and constitute one of the key elements in the local e-inclusion project. Yet from a broader perspective, active incorporation of ICTs into elementary education (and levels beyond it) is essential in the promotion computer and Internet literacy.

We present three central conclusions concerning the public sector provision of LIS services to citizens. First, Web sites require frequent updating and usability testing. These requirements are met by the Tampere portal at <www.tampere.fi> that has become an extensive information source for citizens. At present, the most central concerns to be addressed in order for interactive e-governance to really take off concern the interoperability of the databases of different public actors. Second, the provision of ICT training to citizens is an important method of LIS creation. This cannot, however, bring large scale results unless the computer and the Internet

are firmly integrated into teaching on all levels of the educational system. Third, the creation of digitised local governance is still in its early phase. Important problems in this respect concern the standardisation of public digital authentication (signature), legislation (e-security) and database combining (privacy).

## Citizen and Social Usages of E-Services

So far we have demonstrated innovative actions provided by the local public authorities to promote LIS. To gain a more comprehensive picture, we must consider citizens as clients of LIS. The Information Society Institute, the eTampere sub-programme responsible for social IS research, carried out an extensive survey[5] on citizen perspectives on LIS. The questionnaire included 99 statements and questions on areas such as the digital divide, use of public sector services and citizens' abilities to interact with public authorities via the Internet.

The results clearly indicate various areas of further development. More than one in four (28.2%) Internet users experienced difficulties in interaction with public authorities via the Internet. If the whole sample is considered (including non-users of Internet), the figure increases to nearly half of the population (46.2%). The citizens demand better and more accessible e-services and activities from local public authorities: almost two out of three (62.4%) Internet users agreed fully or somewhat with the statement that public authorities should more actively promote the citizens' ICT skills through provision of free or inexpensive training.

Statistical testing indicated that the most important explanatory variables, in the explanation of IS attitudes and levels of know-how, are general technology usage levels (computer and Internet usage time per day) and socio-economic conditions (age, basic and professional education, current employment and income): the higher the person's socio-economic position, the better their ICT and IS skills are and the more positive attitudes they display towards the IS. Location is also significant: in remote areas, a higher proportion of people suffer from the digital divide.

From these examples, we draw three major conclusions. First, many groups are still unable or unwilling to use the Internet or other e-solutions such as smart cards. Second, public authorities should upscale their e-service provision. Third, public opinion clearly supports the promotion of IS through education and service provision. However, not all solutions are in the hands of local authorities. For example, the problems of digital authentication (digital signature) are national and it is not purposeful for local authorities to create their own 'local citizenship' authentication systems. The citizen-oriented LIS is highly dependent on the development in national IS legislation and administration. Thus, the challenges of LIS service provision are increasingly related to co-operation between different organisations, both public and private, present at different spatial scales. The development of LIS is profoundly intertwined with the development and guidelines of national policies and ICT infrastructure. The possibilities of local actors to promote LIS on their own are limited if national and supranational policies and decisions lag behind or fail to support local initiatives.

## Business-Oriented LIS: Clustering and Networking High-Tech in Northern Finland

The third empirical viewpoint concerns business-oriented IS at the local level and the role of public authorities in it. We examine the case of Multipolis network, an example of regional innovation policy improving the development of technology-related enterprises, products, and activities in a group of localities. The results presented here derive from an survey conducted in spring 2004 regarding high-tech enterprises outside the Oulu urban region in 14 localities including a total of 137 high technology enterprises and 116 other enterprises as clusters located most often in privately-led technology centres (Jauhiainen, in press).[6]

The aim of this public authority policy, called Multipolis, is to maximise the utilisation of technology know-how in northern Finland and to expand the technology-related expertise and knowledge from the highly developed Oulu urban region to other localities in the north. The concrete aim is to create 15,500 new jobs and 400 new enterprises in the high technology sector.

Multipolis is an example of triple-helix (e.g., Cooke, 2004; Etzkowitz & Leydesdorff, 2001) approach in the LIS promotion. The funding for Multipolis comes mostly from the public sector, partly from the Oulu Region Centre of Expertise programme that is part of the nationally funded regional policy. The network is managed by a public sector consortium. The method of Multipolis is to foster the triple helix approach by enhancing co-operation between and among high-tech enterprises, universities, other higher education units, research laboratories, other technology enterprises and regional developers within the Multipolis network.

Multipolis promotes LIS directly due to its spatial concentration on selected localities in which public sector funding and activities (including specialised education and training) enhance private-led technology development and create a fruitful environment for economically

viable innovations in high technology. After four years of implementation, the main result for the high-tech enterprises is the enhanced social networking and cooperation between the enterprises. Also, cooperation between high-tech enterprises and education providers has increased. However, despite the original goals of the network, its impact on product innovation in ICTs and other technologies as well as job creation has been modest (Jauhiainen, in press).

The connection of Multipolis to the national IS programme is evident. However, the connection of this business-oriented LIS to citizen- and governance-oriented LIS is weak. A real challenge is how to improve and embed innovation capacities locally for a more sustainable business-oriented LIS and to move from strategies to practice.

## CONCLUSION AND FUTURE TRENDS

There are several points to be made concerning the relationships between public authorities and the creation of LIS in Finland. First, a conceptual clarification with regard to the use of the concepts IS and LIS in various strategies is necessary. At the moment the IS is not a clear concept but a flexible collection of visions, ideas and ideologies that often operate on the assumption that the development of ICTs will necessarily lead to a knowledge-intensive IS.

Strategies address the question of IS in different ways: technology is portrayed as a tool for economic growth and national competitiveness, mobile communication technologies are seen to provide opportunities for a more transparent and equal society, or the IS is seen as a means for creating employment. The strategy documents for (L)IS studied in this article share a common techno-optimism (and sometimes utopian) promising significant improvements in the lives all Finns (or EU citizens). The documents rarely display any scepticism or constructive criticism.

When IS practices are studied at local level, the picture becomes more real. At least in the Finnish case, there is a gap between the strategic discursive promotion of LIS and its practical implementation. The discourses evoke images of gigantic techno-optimistic leaps, whereas practice consists of modest small steps, for example, of providing access to information networks, arranging for a more comprehensive and even distribution of technologies and providing e-inclusive educational services. The implementation of IS strategies is slower than estimated, and it takes a long time for the practices to enter people's everyday lives.

The gap between policy goals and short-term outcomes derives partly from too messy and ungrounded conceptualisation of IS, its goals and its possibilities. For example, in the case of northern Finland, the local specialisation in high-tech activities makes the localities more vulnerable and dependent on external resources than they were before.

The second issue is measuring the efficiency in achieving the goals of IS strategies. Too much attention has been paid to the spatial distribution and quantity of technological devices and infrastructure. At this point, the use of the technologies and, in particular, the contents used should be brought to the focus: do the contents serve to promote LIS–or do they amount to just another technical organising of local society? Detailed qualitative data is needed to gain an understanding of the LIS that is currently being created by public authorities through multitude of policies and projects. Understanding these relationships requires detailed knowledge of local circumstances, the profound study of which is thus necessary for successful policy evaluation.

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## KEY TERMS



**Digital Divide:** Refers to differential access to ICTs between individuals on the basis of supply, know-how or economic attributes. Digital divides exist on all spatial levels from neighbourhoods to the international level. The term is commonly used to describe the differences between industrialised and developing countries regarding information society and usage of ICT. However, more emphasis should be paid to micro-level developments as well as to themes related to ICT policies and gender, age and ethnicity as modes of inclusion and exclusions in the information society.

**Finnish Information Society Model:** Was suggested by Manuel Castells and Pekka Himanen as socially coherent information society in which public information society policy guidelines play an important role in the situation of simultaneous prosperous economic development and high-level public social services.

**Local Information Society (LIS):** Is a spatially bounded territory, often municipality, daily working area or an administrative region in which public authorities, sometimes in cooperation with the private sector, promote information society in which citizens take actively part of. LIS is enhanced with fostering the usage of ICT and premises of the ICT industry.

**Public Authorities:** Include the organisations and staff of public administration. Public authorities form the overall governmental structure of a state divided most commonly to local, regional and national jurisdictions.

**Public E-Service:** Is a service provided by public authorities to citizens via technologies such as the Internet, mobile phone, smart card, and so forth. Public e-services range from passive information provision to more comprehensive interactive governance processes within the digitalised operating environments.

**Regional Innovation System:** Is a location and context bound framework for innovation producers that are located within a specific geographical area. Actors within this framework thrive to common goal of regional development through innovative actions. Regional innovation system requires actors from all sectors of society: public authorities, private companies, and educational organisations such as universities.

## ENDNOTES

[1] See, for example, the IS classification by Webster (1995, p. 6-25): (1) technical aspect, (2) economic

aspect, (3) occupational aspect, (4) spatial aspect and (5) cultural aspect. Technological development is central for each aspect and it has an impact on both individual and societal levels.

[2] The rate of mobile phone subscriptions per population in Finland is 90.1%, 50.9% of population use the Internet, and there are 2.3 persons per each personal computer. However, the penetration rate of broadband connections was only 12.8% in 2004 (ITU, 2005).

[3] The general goals of the Finnish IS policy programme are: "The information society programme will focus on the utilisation of the opportunities offered by the information society. The aim of the programme is to boost competitiveness and productivity, to promote social and regional equality and to improve citizens' well-being and quality of life through effective utilisation of information and communications technologies … Programme aims to maintain Finland's status as a leading producer and user of information and communications technology. … In addition, the programme will build up citizens' confidence in information society services by improving data security and protection of privacy." (Government of Finland, 2003). Further information is available at <http://www.tietoyhteiskuntaohjelma.fi/en_GB>. This quotation indicates that the role of information technologies and their usage is central to the national IS strategy.

[4] For full information on the eTampere project, see <www.etampere.fi>. The Web site provides the goals, the operational structure, and the history of the project.

[5] The sampling method was a two stage random sample (clustered regional selection and systematic random household selection). The sample size was 2,000 and the response rate 53.1% (1,061 questionnaires were returned). The dataset with full description is available at the Finnish Social Science Data Archive <www.fsd.uta.fi>.

[6] Northern Finland is the home of some one thousand high-tech enterprises, of which three out of four are located in the Oulu urban region. Semi-structured telephone interviews were conducted with 172 technology enterprises outside the Oulu urban region.

# Public Network Access Points



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## INTRODUCTION

The Internet is changing dramatically the way people live, work, communicate, recreate, and participate in public life. But the growth and penetration of the Internet are far from being distributed equally around the globe. In developed countries, the Internet today reaches substantial proportions of the population (e.g., Finland [50,7 %], Germany [56,2 %], the United States [68,8 %]), but in developing countries, Internet penetration often is very low. In Africa, 29 countries still have an Internet penetration of less then 1% (Internet World Stats, 2005).

The unequal access to information and communication technologies (ICTs) today often is called the digital divide. This catchy label stands for a multidimensional phenomenon and describes disparities in access to ICTs along various axes and at various levels. Disparities can be found not only in who physically has access to new technologies and who does not, but also in the distribution of the skills required to use the new technologies in an effective way (Hargittai, 2002; Warschauer, 2003). At the next level, disparities can be found in bandwidth and content available to different groups. These disparities are found among countries (global divides) and among different groups within countries (national divides). Although the existence of a digital divide in one or the other form is clearly accepted among scholars, the dimensions, dynamics, and relevance of this phenomenon are still being discussed strongly (for a more detailed discussion, see Cammaertes, Van Audenhove, Nulens & Pauwels, 2003; Compaine, 2001; Mossberger, Tolbert & Stansbury, 2003; Norris, 2001; Warschauer, 2003; ).

One of the main strategies that is used to spread access to new technologies is the implementation of public network access points (PNAPs) that provide shared and, therefore, cheaper access to communities with low incomes. PNAPs can be defined as physical spaces where people can access ICT for personal, educational, economic, and democratic development without having to own the necessary hardware and software.

This article will give an introduction to PNAPs, starting with a short look at the emergence of this access model, which can be traced back to the early 1980s. After that, the different models that have evolved over the years in different regions of the world will be described briefly before taking a closer look at the role that PNAPs can play in the context of e-governance. Finally, some critical issues like sustainability, content, and management will be discussed before conclusions are drawn.

## BACKGROUND

The PNAP scene that we see today is a very diverse and fragmented one. A variety of different models have evolved over the last 25 years, some of which can be found around the globe in places like cyber cafés; others exist only in specific regions such as village kiosks, which can be found only in rural areas of developing countries.

One of the first organizations that showed the importance and impact of public access to ICTs was the NGO Playing to Win (PTW) in the United States, which implemented the Harlem Community Computing Center in 1983 (Miller, 2000). Similarly, there have been many programs in other countries, like the Community Access Program (CAP) in Canada, which tried to foster development at the community as well as the individual level by offering public and shared access to ICTs.

In rural areas, one of the first documented projects that offered public access was the Vemdalen Telecenter in Sweden, which was implemented in 1986 (Fuchs, 1998). The Vemdalen Telecenter offered access to new technologies to individuals and to small-scale businesses in the region. This successful project was replicated soon after its implementation in many European countries in order to ensure access to new technologies, especially for people and small businesses in rural areas. In particular, the idea of supporting small and medium-sized businesses by providing shared and, consequently, cheaper access to otherwise expensive new technologies was often the driving force behind the establishment of similar projects in other industrialized countries in the mid-1980s and early 1990s. These models, which were based on shared use of technologies, have been considered powerful tools for the diffusion of the Internet and network-related skills in developing countries. Thereafter and since the end of the 1990s, these models have been implemented widely in Africa, Asia, and South America, mostly with the help of organizations like ITU, IDRC, USAID, and UNESCO.

Since then, a variety of different models have evolved. There have been several attempts to classify the different models, like those developed by Gomez, Hunt, and Lamoureux (1999), Colle (2000), and Lachmayr (2003), who classified them according to size, management-mode, or target group. The following section will give a short overview of the most common models that are based on the previously cited works.

## TYPOLOGY OF PNAPS

There are at least six main models of PNAPs, which differ from each other in various aspects. However, they have to be seen as just theoretical, as PNAPs in reality often appear as a combination of different models.

### Village Information Kiosks

Village information kiosks often are extended STD/ISD phone shops that have one or two additional computers connected to the Internet via dial-up connection or any other narrowband type of connection like UHF or VHF radio transmission. Recently, as in the case of the SARI project, advanced wireless technology (WLL) also is being used (Jhunjhunwala, Ramachandran & Bandyopadhay, 2004). The village kiosk usually offers phone calls; Internet connectivity; information services; health-related, educational, and e-government services; along with some other computer-related applications like word processing, scanning, or printing. But according to Colle (2000), the main focus of these centers is communication-related. One of the most interesting aspects of this model is the management mode, as it is run mostly by private entrepreneurs, such as the SARI-project, where local entrepreneurs can open a village kiosk with an investment of $1,000 US (Jhunjhunwala, Ramachandran & Bandyopadhyay, 2004). Some of the biggest problems can be seen in the task of achieving sustainability, creating awareness for the offered services, and accommodating the low educational levels of the rural population, but despite these problems, this model seems to be highly interesting in the spread of the use of ICTs into rural areas in developing countries.

### Telecenters

According to Gomez, Hunt, and Lamoureux (1999), telecenters are one of the most common PNAP models implemented in developing countries. They usually are equipped with five to eight computers, use a broadband connection, and offer more advanced services than the village information kiosks. There are examples of telecenters that are run by private entrepreneurs, but mostly, they are implemented and managed by NGOs, as the initial and operational costs are too high for private entrepreneurs in developing countries. Telecenters also can be found in developed countries, where often they are part of a regional development strategy. One of the main tasks of telecenters is the development of skills; especially in developed countries, these centers often are used to support people in gaining computer-related skills, which enables them to make online job searches and prepare application materials (Chow, Ellis, Walker, & Wise, 2000).

### Multipurpose Community Telecenters

The multipurpose community telecenter model is set up with 10 to 20 computers. It offers more than just basic access to the Internet and often focuses on educational issues and community development. It is equipped with the latest technology and offers top market applications like videoconferencing, e-governance, and telemedicine in rural areas. In many ways, this model is similar to telecenters; the main distinction is its size and the services that it offers. Because of its size and the variety of services it offers, a multipurpose community telecenter is implemented and run only by NGOs or governments. These centers often aim not only at enabling access and training but often also are part of broader community development strategies. Whereas this model has become quite common in the developed world, especially in urban areas, it seems to be oversized and too expensive to work effectively in developing countries.

### Civic Access Centers

Based in schools, universities, libraries, post offices, or other civic buildings, Civic Access Centers often offer the general public access to computers and network connections, just as some schools or universities offer the general public access to their equipment at certain times (Proenza, Bastidas-Buch, & Montero, 2001). In most developed countries, like the United States, Germany, Japan, and Australia, libraries offer their customers free Internet access as an additional service. These centers usually neither publicize their services very openly nor concentrate on training or education (Gomez, Hunt, & Lamoureux, 1999). However, in some regions of the world and for some groups, especially in the developed world, these centers seem to be an important access point, as home access or other public access places may not be available (Gordon & Gordon, 2005; Erikson, 2005). Civic access centers can be seen as a necessary government service to the general public, as citizens have the right to

access information and new services and as these centers become the most basic way to ensure that people at least have the possibility to access them.

### Cyber Cafés

Cyber Cafés are commercial, market-driven phenomena that occurred in the early 1990s with the diffusion of the Internet in most urban cities of developed countries, especially in the US. According to Stewart (2000), they should not be seen just as an additional access point to the Internet but rather as a new public space and part of temporary culture. They have played an important role in spreading knowledge about the Internet and have served as an access point for specific communities (e.g., students) in the early days of the Internet, but today, with the diffusion of home Internet access in developed countries, their importance has been considerably reduced. However, the situation is dramatically different in developing countries, where they have become almost ubiquitous. Cyber cafés in developing countries, especially in urban areas, are mushrooming and serve as a critical part of society (Haseloff, 2005).

### Mobile Access Solutions

There are other various projects, where access points are mobile in order to reach distant rural communities, like the Internet on Wheels project in Malaysia, where a bus equipped with modern technologies brings the Internet to remote areas by using a satellite connection. There are other similar projects, for example, in India and South America. All these projects have a mobile unit that temporarily brings network technology to remote and unconnected rural areas. But the important word is *temporary*. Temporary means that the facility will be available to the rural communities only for a short time and only occasionally. Such projects may be very helpful in creating awareness about new technologies, but they cannot be seen as long-term solutions.

The previous examples provide an idea of various possible models. But despite all these differences, PNAPs have some common features: they offer network access to people who can't afford to have the necessary hardware and software at home, who can't afford to pay the monthly connection fees, or who just need support in order to use the new technologies. There are major differences between PNAPs in developing and developed countries, as well as between rural and urban areas within a country. Generally, PNAPs play a much bigger role in developing countries, where they are not just an additional access point but often the only access point with which to access ICTs.

## PNAPS AND E-GOVERNANCE

There are several common services and applications available in the different PNAP models. Some, like e-mail, are ubiquitous; others, like telehealth, are found only in a few projects. PNAPs usually offer the following:

- New and cheaper modes of communication
- Educational information and applications
- Job and job-search information and applications
- Microfinancial/e-commerce information and applications
- Health/telehealth information and applications
- Recreation

In addition to these applications, PNAPs are an important and effective delivery point for new e-governance applications. At present, there are different applications available in some projects, including mainly the following:

- Government information and schemes
- Government services and applications
- Online payments
- Communication with politicians (using e-mail, chat, or Webcam)
- Digital land mapping
- Election and party/candidate information
- Civil rights/legal and social information

PNAPs have to be seen as an important delivery point for any possible e-government service, and as of today, PNAPs are a necessary tool in order for various groups to access these services, as they have no alternative access point. From a democratic point of view, e-government services only can be introduced if all citizens theoretically have a possibility to access them. As Internet access at home or at work is far from being available to the total population, even in the most developed countries, PNAPs in this context need to be seen as necessary institutions for the delivery of e-government services, at least until universal home access is reached.

## DISCUSSION

The implementation of PNAPs, especially in developing countries, is a difficult and controversial task. On the one hand, it often is criticized that marginalized rural communities are more in need of water pipes than data pipes (Greis, 2004); on the other hand, such projects can have a strong impact on marginalized communities, if they are implemented according to their needs. The most critical

issues determining the success of PNAPs can be seen in the management mode, sustainability, and creation of local relevant content and applications.

## Management

Arunchalam (2002) suggests a bottom-up approach, in which communities are involved from the planning stage on. He also points out the need for involving the local community in managing centers at the village level. Generally, these centers can be managed in two forms: either a center run by an organization or by a local entrepreneur. Recently, most of the newly implemented projects are based on the entrepreneur model, but there are several problems that need to be considered. Jhunjhunwala, Ramachandran, and Bandyopadhyay (2004) discuss the role of the entrepreneur. Their main findings are the following:

- The entrepreneur is a critical factor for the success of PNAP projects.
- The entrepreneur needs special training to develop a variety of needed skills, technically, socially, and economically, as he or she is the interface between the local community and technology.

In addition to the entrepreneur model, other forms of management can be successful, as long as they follow a bottom-up approach, evaluate and respect the needs of the communities, and do not place technology above the people, as technology is merely a tool.

## Sustainability

The most critical issue determining the success of PNAP projects is the task of reaching sustainability. Especially in a long-term view, sustainability determines whether these projects continue to remain after the implementation stage. There are many projects that failed because sustainability could not be reached, and a successful PNAP project needs to develop clear strategies regarding sustainability. In order to achieve sustainability, several services and applications need to be offered; it has been demonstrated that these necessarily do not have to be network-related. In this context, governments and organizations need to support such projects, either financially or by developing services that can be offered in PNAPs.

## Local Relevant Content

The content available on the Web is growing every day. From a Western point of view, there is enough free and easily available content on the Web to fulfill the needs of most users, but the situation is dramatically different for rural and marginalized communities in developing countries (Warschauer, 2003). One has to bear in mind that most of the content is produced in and for developed countries. Content not only needs to be in the local language but also needs to target the needs of rural communities. It is not enough to translate existing content into different languages, as the needs of rural communities differ significantly from those in developed countries. Therefore, a critical factor regarding PNAP projects is the production of local relevant content (Gurstein, 2003). An important question in this context is who will produce this content, as the commercial sector doesn't target these markets because of the lack of revenues. In the future, organizations like the United Nations and governments need to play a stronger role in creating content, as it is not enough to provide just technology and connectivity. Taking a look at PNAP projects all over the world shows that, until today, a variety of interesting and valuable content has been produced, but there is a lack of exchange and networking among various projects. Especially governments and development organizations need to focus more strongly on this aspect in order to make technology useful for marginalized and rural communities.

# FUTURE TRENDS

If one takes a look at the PNAP scene today, it can be seen that PNAPs have become a global phenomenon. On the one hand, the commercial sector, like cyber cafés, has spread to almost all urban areas, and in countries like India and Turkey, PNAPs projects can be found even in bigger villages. They already serve a crucial role for Internet users and have become an important institution. On the other hand, organizations and governments have implemented development-oriented projects in many rural areas of developing countries. The significance of such projects in the future depends strongly on the spread of home Internet access, and in many developing countries, PNAP projects will remain significant only for small groups, as access to the Internet at home or at work may reach considerable proportions of the population in the future. But for developing countries, the situation for the major part of the population is dramatically different: PNAPs in developing countries will remain the only way to have access to the benefits of the network revolution for substantial parts of the population. In India, Mission 2007 plans to implement an information kiosk in every village until 2007. This ambitious goal gives an idea of the future significance that such projects can have.

## CONCLUSION

Public network access points (PNAPs) can play an important role in bringing the benefits of network technology to underprivileged communities by providing access and, equally important, by providing training to people in order to enable them to use the technologies effectively. Especially with the growing number of e-governance applications, from a democratic point of view, PNAPs are needed for people who don't have access elsewhere.

Today, these models are implemented as projects on a global scale in almost every region of the world. However, such models never should be seen as solutions to reduce poverty, unemployment, or other structural problems in rural areas. One should not forget that the widening gap between those who have access to clean water and those who don't is much more dramatic in its outcomes than the so-called digital divide. Technology only can act as an effective tool, never as a solution to structural problems. PNAP models always have to be part of overall community development programs, which include structural, environmental, and gender issues and involve the communities in its development and management. If these issues are considered, PNAPs in the future can become important institutions, especially in developing countries, which not only help to bridge the digital divide but also foster community and individual development.

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## KEY TERMS

**CorDECT WLL:** An advanced wireless access system integrating voice and data services. This technology was developed by Midas Communication Technologies, the IIT Madras, and Analog Devices, USA.

**Cyber Cafés:** Commercial institutions that provide Internet access on a pay-per-view basis. Today, they are found in urban areas all over the world.

**Digital Divide:** Refers to the gap between those people who have access to new technologies, especially the Internet, and those who do not. Inequalities, however, are not restricted to physical access, and the current debate also covers the unequal distribution of skills to effectively use new technologies, the unequal distribution of content and applications for different communities, and the differences in the motivations of people to use new technologies.

**Public Network Access Point:** A physical space where people can access ICT without owning the necessary hardware and software and where they can achieve training in the needed skills to effectively use this access for personal, educational, economic, and democratic development.

**Universal Access:** Refers to allowing everyone in a country to have access to basic telecommunications that work within a reasonable distance and at a reasonable cost.

**Universal Service:** The principle of providing affordable basic telecommunications services for all households in a country.

**Village Kiosk:** Small shops that have one or two computers and that offer Internet access and communication and information services in rural areas of developing countries.

**VoIP:** A technology for transmitting voice, such as ordinary telephone calls, over packet-switched data networks.

# Public Sector E-Commerce

P

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## INTRODUCTION

Electronic commerce or e-commerce has the potential to streamline existing functions and services in the public sector by reducing transaction costs or the cost of doing business. This article provides an overview of some of the critical e-commerce issues for the public sector focusing on its impact on reducing transaction costs.

## BACKGROUND

E-commerce in the public sector has been defined as any process or transaction conducted by a government organization over a computer-mediated network that transfers ownership of or rights to use, goods, services, or information (Stowers, 2001). Public sector e-commerce has also been defined as the subset of e-government involving the exchange of money for goods and services purchased over the Internet by citizens and businesses (Reddick, 2005). The main aspect that defines e-commerce is transactions between government and citizens or businesses involving the exchange of money. Therefore, e-commerce is the use of the Internet and the Web to transact business. More formally, e-commerce is digitally enabled commercial transactions between and among organizations and individuals (Reddick, 2004b).

Generally speaking, one definition of electronic government or e-government refers to the use of technology, particularly Web-based Internet applications, to enhance the access to and delivery of government information and services to citizens, business, partners, employees, other agencies, and entities (GAO, 2001). E-commerce is a subset of e-government, is more restrictive in that it focuses on government transactions over the Internet. E-commerce is one way for government to reduce transaction costs and hence save budgetary resources, an especially critical function in fiscally restrained governments as witnessed by some of the transactional services offered online.

## E-COMMERCE TRANSACTIONS

Survey data on the U.S. state government use of e-government was compiled by this author and was taken from the Center for Digital Government (2003) (Table 1). The 2002 data indicates that the top five most popular online services were job searches (done by 48 states), unclaimed property searches (46 states), college admissions (45 states), legislative tracking (45 states), and personal tax filing (43 states). Other interesting observations were that driver's license renewals were done in eight states and auto registration renewals were provided in 18 states. Therefore, many of the top services involve information searches such as online job searches and unclaimed property search.

The results in Table 1 indicate that e-government has changed the traditional way of advertising for a government job. It has also made it much easier for citizens to locate lost property. The college admissions process has been streamlined because of the Internet. In terms of e-commerce and transactions being completed online, filing personal taxes, for instance, was done in almost all of the states. This article focuses on the development of transaction-based e-commerce, since e-commerce is not possible unless there is a transaction between two parties over the Internet. A model of e-government adoption can be used to explain the evolution of e-commerce.

There are several stages of e-government growth. In the first stage, there is the cataloging of information on government Web sites (Layne & Lee, 2001). In this stage, there is no interaction with the citizen or business, just the presentation of downloadable forms or Web content for users. Most governments are in this stage of development because they have their own government Web sites disseminating information to the public. However, e-commerce is not prevalent in this stage because there are no transactions taking place between the user of the government Web site and the agency providing information or services.

The second stage is the transaction phase (Layne & Lee, 2001). There is some initial evidence in the United States suggesting that e-government has entered the transaction-based phase of e-government adoption (Edmiston, 2003; Holden, Norris, & Fletcher, 2003; Layne & Lee, 2001; Reddick, 2004a; Reddick, 2004b; Reddick, 2005; Wang & Rubin, 2004; West, 2004). This phase is where e-commerce comes to life. Governments make available working databases that support online transactions such as renewing a driver's license or filing taxes (Table 1). As a result of putting live databases online, govern-

*Table 1. Top 35 U.S. state government online services. Ranking of services in 2002 (0 to 50 scale) (Compiled from data from the Center for Digital Government, 2003)*

| Ranking of Service | Online Services | Number of States offering these Online Services | Ranking of Service | Online Services (continued) | Number of States offering these Online Services |
|---|---|---|---|---|---|
| 1 | Online Job Search | 48 | 19 | UI Filing and Payment | 17 |
| 2 | Unclaimed Property Search | 46 | 20 | Retirement Benefits | 15 |
| 3 | College Admissions | 45 | 21 | Contractor Look Up | 14 |
| 4 | Legislation Tracking | 45 | 22 | Personal Property Tax Payments | 13 |
| 5 | Personal Tax Filing | 43 | 23 | UCC Filings | 12 |
| 6 | Court Decisions Look Up | 34 | 24 | Social Service Directory | 9 |
| 7 | Sex Offender Look Up | 33 | 25 | Driver's License Renewal | 8 |
| 8 | Business License Look Up | 32 | 26 | Adoption Services | 7 |
| 9 | Vital Records | 31 | 27 | Corp. Biennial Reports | 7 |
| 10 | Business Tax Filing | 30 | 28 | Criminal History Lookup | 6 |
| 11 | Professional License Look UP | 30 | 29 | Motor Vehicle Citation Payments | 6 |
| 12 | Fishing and Hunting Licenses | 28 | 30 | Vanity Plates | 6 |
| 13 | List of Active Contracts | 27 | 31 | Auto Licensing | 5 |
| 14 | Apply as a state employee | 23 | 32 | Child Support Payments | 4 |
| 15 | Park Reservations | 22 | 33 | Lobbyist Registration | 4 |
| 16 | Renew Professional Licenses | 22 | 34 | Court Filings | 2 |
| 17 | Auto Registration Renewal | 18 | 35 | Online Voter Registration | 2 |
| 18 | Business Registration | 18 | | | |

*Note: UCC = Uniform Commercial Code; Top five e-commerce services in bold*

ments can cut back on staffing offices since citizens and businesses now have the option of going online for selected services. There is, of course, still the problem of the digital divide where certain groups, such as minorities, elderly, low income, and those with disabilities do not have as much access to the Internet or are not as Web savvy, although this gap is shrinking over time (U.S. Department of Commerce, 2002). Besides the important issue of the digital divide, this article examines transaction costs theory and its impact on e-commerce adoption.

## TRANSACTION COSTS THEORY

One of the reasons for the adoption of information technology, and especially the Internet, is the reduction of transaction costs. Information technology helps government decrease in size because it can reduce transaction costs—the costs incurred when government buys on the marketplace what it cannot make for itself (Fountain, 2001; Laudon & Laudon, 2003; Thurmaier & Chen, 2005; Williamson, 1985). The principle idea of transaction cost theory in its application to e-commerce is that governments incur transaction costs when they conduct business. Simply stated transaction costs are the costs of making an economic exchange. The costs in government transactions include search and information costs, bargaining costs, and policing and enforcement costs (Thurmaier & Chen, 2005).

Information technology with the aid the Internet can also reduce internal management costs. According to the agency theory, the government can be viewed as a "nexus of contracts" among self-interested individuals rather than a unified entity (Horn, 1995). In this theory, a principal (e.g., departmental manager) employs "agents" (employees) to perform work on his or her behalf, however,

agents need constant supervision from management because they will tend to pursue their own interests rather than those of their managers. Information technology permits public organizations to reduce agency costs because it becomes easier for managers to oversee a greater number of employees, when the number of middle management and clerical workers is reduced. Other issues of e-commerce that should be discussed address impacts from management, policy, and technology capacity.

## STATE PUBLIC SECTOR E-COMMERCE ISSUES

The National Electronic Commerce Coordinating Council (NECCC) in conjunction with the Center for Digital Government addressed some of the issues that state governments will face in the implementation of electronic commerce (NECCC, 1999). These issues are common to e-commerce at most levels of government. There are four areas: enterprise administration, technologies, management, and policy. Each area will be briefly discussed along with its key issues (Table 2).

In terms of enterprise administration, some issues in this category are leadership and governance (Table 2). An enterprise approach to governance is recommended to maximize efficiencies and create a sense of empowerment in the implementation of new business processes. Leadership and vision at the executive level are critical elements of successful e-commerce (GAO, 2001). A second issue in the enterprise administration category is privacy. There should be informed consent at the point of collection, limiting collection to required elements, allowing subjects to view and correct information, obtaining consent for any additional use of information. The third issue in the category is security. In implementing security solutions, governments should support open standards and choose commercially accepted technologies. The fourth issue in the enterprise administration category is electronic payments. Governments need to explore the full range of electronic payment mechanisms for both inflows and outflows including credit cards, debit cards, electronic funds transfer, micropayments, electronic wallets, and e-checks. Laws must be in place to support new and emerging technologies such as digital signatures, electronic records management, and electronic payments (NECCC, 2002).

Another important issue in state use of e-commerce is technologies (Table 2). Governments have been trying to create a "single face" by re-engineering their Web sites into service delivery mechanisms (i.e., Web site portals). The two general models prevail: a government-funded approach that uses an appropriation of the state budget and a self-funded model (Johnson, 2003). Each service offered on the Web portal may have its own financial model, advertising revenue, convenience fees, and documented cost savings that all contribute to an overall financial strategy. A second issue in the technologies' category is applications developed from electronic commerce. By leveraging a standards-based infrastructure and browser-based tools, government agencies can streamline their internal processes and applications, enabling employees to use self-service tools. A third issue in the technologies' category is infrastructure. The most common challenge to almost any information technology project is funding. Governments must figure out how to pay for their e-commerce projects. The fourth issue in the category of technologies is standards. Consistent standards are important in order to ensure interoperability, compatibility, and shared usage of electronic commerce resources.

Management is the third category of successful e-commerce, and I argue that it is the most important issue (Table 2). Some of the existing literature supports the conclusion that more effective management leads to greater e-government adoption (Holden, Norris, & Fletcher, 2003; Reddick, 2004b). Funding is one of the issues in management that has its own set of challenges. There are three main funding and financing models for government Web site portals (Johnson, 2003). In the

*Table 2. A selection of e-commerce issues for governments*

| Enterprise Administration | Technologies | Management | Policy |
|---|---|---|---|
| • Leadership and governance | • Portals | • Funding | • Digital divide |
| • Privacy | • Applications | • Marketing | • Economic development |
| • Security | • Infrastructure | • Personnel and training | • Taxation |
| • Electronic payments | • Standards | • Economies of scale | |

traditional model, monies are appropriated from the general fund and sometimes charge-back pricing occurs. The second model is the infrastructure finance model. The funding scheme is from debt proceed funds generated from the sale of state or local government bonds. The third funding model is the Internet based approach. The funding stream for this model is either advertising and or transaction-based revenue. Another often-overlooked issue in the category of management of public sector e-commerce is marketing. Edminston (2003) suggests that if e-commerce is to become successful, governments will be required not only to build and maintain useful Internet Web sites and portals, but also to educate their constituents about the availability of online public services and the benefits of using digital government resources. The third issue in the category of management is personnel and training. Some of the issues involved with electronic commerce and training include the short lifecycle of technology and the variety of technologies. Both of these require management to make strategic decisions regarding technology training. The fourth issue in the management category of e-commerce development is economies of scale in service provision. Since governments obviously have limited goods to sell to the public or business, one would expect to see the most e-commerce applications in the areas where funds exchange hands—taxes, licenses, permits, and procurement (Stowers, 2001).

The fourth category is electronic commerce policies and one key issue in this category is the digital divide (Table 2). There is a large group of citizens and small businesses without access or any real knowledge of the tools required to use the Web as a medium for conducting affairs (Edmiston, 2003). The second issue in the policy category is that of economic development. When private businesses can do everything online from obtaining permits to renewing licenses, the government offering these services is considered business friendly. The last issue in the policies category is taxation. If an Internet business has no physical presence in the jurisdiction, the company is not collecting sales tax, paying business license fees, property tax, real-estate tax, income tax, or employing local citizens (Nesbary, 2000).

## FUTURE TRENDS

Public sector e-commerce in the future will increasingly expand as citizens and businesses grow accustomed to using online services. In addition, as some of the aforementioned issues such as management, privacy, and technology capacity receive greater attention, e-commerce should significantly expand. The potential for e-commerce to reduce transaction costs for government agencies makes it very desirable for them to accept online payments for services.

## CONCLUSION

Public sector e-commerce is different from e-government in that it focuses on citizens or businesses using the Internet to conduct transactions with government such as renewing a driver's license or filing taxes. Governments often take part in e-commerce initiatives in order to reduce transaction costs. Governments in the United States are mostly cataloging information online; there is not as much development into conducting transactions online. Some of the e-commerce issues discussed in this article that should be addressed before more transactions are completed online are enterprise administration, technologies, management, and policy.

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## KEY TERMS

**Convenience Fees:** A fee charged to the public or businesses for the privilege of using an online government service such as renewing a driver's license online.

**Digital Divide:** Large differences in Internet access and e-commerce access among income, ethnic, and age groups.

**Digital Wallet:** Authenticates the consumer through the use of digital certificates or other encryption methods, stores and transfers payment, and secures the payment process from consumer to government.

**Government-Funded Portal:** The government uses its own funds to start up an e-commerce Web site.

**Micropayments:** Part of a digital wallet function. Used for payments under $5 anywhere on the Web based on credit cards.

**Privacy:** Includes both the claim that certain information should not be collected from the Internet at all by governments, and the claims of individuals to control the use of whatever information that is collected about them.

**Public Sector E-Commerce:** Public sector e-commerce is defined as the subset of e-government involving the exchange of money for goods and services purchased over the Internet by citizens and businesses.

**Security:** Educates and trains users, keeps management aware of security threats and breakdowns, and maintains the tools chosen to implement security on a government Web site.

**Self-Funded Portal:** Private vendors pay for the start-up costs of an e-commerce Web site and recoups their costs of investment through online transaction charges and subscription fees.

**Web Site Portal:** Is an integrated gateway into a government Web site and provides visitors with a single point of contact for online service delivery.

# Radio Frequency Identification as a Challenge to Information Security and Privacy

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## INTRODUCTION

New technology has continuously changed the face of computing, and each change has involved an improvement in computer architecture and information processing. There are strong indications that the next paradigm shift in information technology will be kicked off by tiny radio frequency identification (RFID) tags. These lowly devices are being ushered in by corporations like Wal-Mart to facilitate business logistics, but other uses are waiting in the wings. As usual with any technology, criminally-minded individuals have been quick to exploit smart tags for their own purposes. Thus, it is in place to take a look at the dark side of RFID technology to see how it may affect the security and privacy of citizens.

## BACKGROUND

Information security work is a relentless struggle against evil. Previously, a balance was sought chiefly between usability and security, but recently a new axis has been added, namely, social control and privacy. However, this is still a simplification that does not reflect the so-called real world sufficiently well, considering that there are more aspects to it than those four. For example, there is the three-way relationship involving the individual, organization, and technology that should be taken into account, not to mention certain business aspects.

On the road to the information society, we have passed through the agricultural and the industrial society. The large-scale application of computers and wireless communications are characteristics of the automation society, a precursor to the information society (Anttiroiko, 2003). Despite the progress we have made, it appears that taking small steps is not enough in order to get to the destination. What is needed is a comprehensive change at the global level.

One impulse that triggered a wave of change across the globe was the Universal Bar Code which, although originally designed to facilitate supply chain management, inventory management, and product identification, will inevitably affect most aspects of information processing and business. Behind this impulse was a decision taken by Wal-Mart in the 1970s to stop handling goods that are not bar coded. Now the company has issued a similar demand: all products must have an RFID (radio frequency identification) tag by the end of 2005.

RFID tags are computer chips that broadcast a 96-bit code that can be used to uniquely label individual items, rather than just product types (as does the UBC). RFID systems comprise a transponder, or tag, that responds to wireless signals produced by a transceiver, or tag reader, which also powers the tag. Readers identify tags placed in all products by referring to an associated database. A typical reading distance, without line of sight, is two to eight meters.

Product identification tags come in two varieties: the first one is placed on packaging, while the other type is placed on the product. For obvious reasons, the latter type is much more likely to put personal privacy in jeopardy.

Little attention was attached to reading devices such as Wal-Mart's prior to 2004, when international RFID frequency ranges were determined. As a result, each continent now has its own specific standards. Even more importantly, each tag is equipped with circuits for two different frequency ranges (Want, 2004).

Mobile phones are also getting new features. For example, the city of Oulu introduced a new parking pay system which can be accessed through cell phones. In autumn 2004, a new mobile service was presented enabling cell phones to be used as automated readers for RFID tags.

*Table 1. Basic rights of citizens in the European union*

| |
|---|
| • Right to liberty and security (article 6) |
| • Protection of personal data (article 8) |
| • Freedom of expression and information (article 11) |
| • Workers' right to information and consultation within the undertaking (article 27) |
| • Right of access to documents (article 42 |

## LEGAL STANDARDS WITHIN THE EUROPEAN UNION

In our society, citizens and organizations have rights and responsibilities regarding information. A continuous debate focuses on fundamental individual and communal liberties and rights, although no general solution that all parties would find satisfactory is in sight.

Citizens of the European Union have at least the following basic rights presented in Table 1 (European Commission, 2000).

To ensure that these rights are respected, information security solutions must be well balanced. It is impossible to stop progress or even slow it down, for technological innovations, which inevitably create new challenges, possibilities, and threats, are part and parcel of our society and lifestyle.

## INFORMATION SECURITY DEMANDS

Discussions on information security often begin with a reiteration of the dimensions of the so-called CIA model, to wit, Confidentiality, Integrity, and Availability (Anttila, Kajava, & Varonen, 2004; BSI, 1993; Canadian Royal Mounted Police, 1981; ISO, 1995, 2001; Longley & Chain, 1989; Parker, 1981; Schweitzer, 1990). In terms of RFID tags, these dimensions are essential, but even more important is another, less discussed, dimension: Traceability. Most people are aware of its existence, thanks to its application in mobile phone tracking systems and satellite surveillance systems. Despite the advantages that traceability offers, there is also a downside, for tracing the position of an individual may violate the individual's personal location privacy and constitutional rights.

Another challenge that such surveillance gives rise to, involves the right of authorities to use a person's cell phone to locate him, for example, when a mishap is suspected to have occurred.

Satellite surveillance is a more convoluted phenomenon. Can it be justified by reason, or is it just a matter of the stronger side dictating the rules? Moreover, as satellites know no national boundaries, which national legislation should be observed? Harmonizing legislation in any area is a daunting task, and information security is no exception. To give an example of the range of approaches, we could cite a case from the late 1990s. An armed robbery took place on an Italian motorway, but the perpetrators were caught thanks to a photo taken by an American surveillance satellite, revealing their car's licence number. At the same time, a debate raged in Finland over the right of the police to acquire telephone data on two men suspected of involvement in drug trafficking.

## INVESTMENTS AND EXISTING APPLICATIONS

Although the spirit of the times seems to be that the pervasive introduction of RFID systems is a thing of the future, big players are already jockeying for position. IBM and Hewlett-Packard, for example, have invested $250 million and $150 million, respectively, on RFID-related research projects.

Some projects are no longer on the drawing board. In the Japanese city of Osaka, city authorities have launched an initiative in which schoolchildren in certain parts of town are equipped with RFID tags. These tags are placed in their clothes, bags, or name tags and are used to keep track of the children's whereabouts. RFID readers are positioned at the school gate and other critical places along the way to school.

This decision indicates that the children's parents and local authorities set more value on security than privacy. Strictly speaking, though, this is not completely true; after all, they are only creating a more extensive surveillance network around their children, while keeping their own privacy intact.

Another area where RFID technology has been applied for years is the satellite surveillance of expensive cars. Should one of these cars be stolen, locating it is generally not a difficult task. Moreover, owners are within their legal rights to install RFID tags on their cars in order to protect their property.

*Table 2. Information security and privacy-related concerns, expressed in conjunction with RFID tags*

| |
|---|
| • Maintaining the privacy of citizens in the novel situation |
| • Prevention of crime in the traditional business world |
| • Utilization of this new technology by criminals |
| • Expansion of surveillance technology |
| • Potential introduction of a new, epoch-making person identification system |

RFID technology will undoubtedly revolutionize business logistics, allowing businesses to better manage inventory, fight counterfeiting, gauge-marketing efforts, and so on. Simultaneously, it will also affect other aspects of society. One example of this is their proposed use in passports and other identification documents. As a matter of fact, this little component is thought to represent the decisive invention that takes us to the Information Society.

## PRIVACY CONCERNS ASSOCIATED WITH RFID

Several information security and privacy-related concerns, not to say challenges, have been expressed in conjunction with RFID tags in Table 2. Most of these challenges are not yet factual, as current RFID systems are mainly trial systems. However, before the large-scale introduction of this technology, issues such as these must be addressed.

The dark side of RFID tags begins at the moment a customer picks up a tagged product from a shelf. For example, in an effort to thwart shoplifters from stealing Gillette's Mach 3 razor blades, the supermarket chain Tesco installed cameras that snap a security picture whenever a package is picked up. Following this line of development to its logical conclusion means that, very soon, when we are dithering whether to buy product A or B, all our musings can be recorded.

The threat is by no means over when the shopping cart passes the store's reading device (McCullagh, 2003). In some cases, checkpoint clerks may delete the tag's contents, but this procedure may also erase important product information (such as user instructions). However, should these tags not be removed, they will remain in the product throughout its lifecycle, all the way to the refuse dump. This means that anyone with an interest in following the route of the product may do so using, for example, a cell phone.

RFID tags contain two circuits operating at different frequencies. Both are designed for a particular purpose. With a reading range of up to three meters, without line of sight, readers at stores are able to communicate with one of these circuits. The other one responds to another type of reading device, such as a cell phone, which can be used by the customer at home to read the product's washing instructions, for instance. This device has a range from zero to about 10 centimetres.

Defining dedicated operating frequencies solved the first problem hindering the large-scale adoption of smart tags. At the next stage, these tags are beginning to be used in applications other than business logistics. A case in point is the stance taken by the parents in Osaka, Japan, to use RFID tags to monitor their children. The next step, however, is much more cumbersome as it involves extending surveillance from children to adults. Installing reading devices and tags in working places is a particularly knotty issue.

## COUNTERMEASURES

Several ways have been suggested for countering the threat on privacy imposed by RFID. Of these, the simplest one involves introducing an opt-out capability which allows consumers to identify tags and remove them.

Another alternative is the use of so-called blocker tags which prevent tagged goods or people from being tracked outside the store. Blocker tags turn the tables on criminals as they operate on a principle that is one of hackers' favourites: denial of service. Tag readers usually read the 96-bit code one bit at a time, checking whether any tags in the vicinity have a 1 in that position and then whether they have a 0. Then the same query is made concerning the next bit. Having gone through the code, the reader is then able to identify the tags. A blocker tag, however, confuses the reader by responding to all queries, rather than just to its own specific 96-bit string.

Government regulation is absolutely necessary for applications such as passports, for who would want their identity and nationality to be identified by non-authorities. Some form of government regulation has also been suggested for commercial organizations for fear that they will not be able to self-regulate the use of RFID technology.

## RFID AND THE INTERNET

RFID has capabilities than can be exploited for the prevention of crime, for example, some products come with a tag that functions as a type of theft alarm. Nevertheless, professional criminals are already using reading devices, like cell phones, to detect what products shoppers are carrying and selection their targets on the basis of that information. Some walk around residential areas with readers trying to locate suitable targets to burgle.

Examples such as these clearly illuminate the dark side of RFID technology. But to properly understand the extent of the threat, we must consider the progress of telecommunications. Most homes are now connected to the Internet, but the rapid development of ad hoc networks and ubiquitous computing exacerbate the problem.

On top of the risks attendant on wired communication, wireless communication has a host of problems specific to it. A central factor is its dependence on the reliability of communication networks. Take industrial automation systems, for example, which increasingly utilize public networks, although the security features of these systems do not always correspond to present-day requirements. At another level, homes are no less vulnerable to threats than industrial automation systems. An ever greater number of homes are connected to the Internet through a multitude of electric appliances and devices, including set top boxes for TV. And this trend will continue at an increasing speed as refrigerators, microwave ovens, burglar alarms and air conditioning systems, among myriad others, are acquiring Internet capabilities.

As for ad hoc networks, RFID introduces a definite new threat. Ad hoc networks do not have a conventional support server or power source, they take their resources from wherever these are available. The first hitch is that, because devices in ubiquitous, or ever-present, computing environments are equipped with small power sources, they will inevitably lose their efficiency. Another risk involves the case presented earlier, in which criminally minded individuals prowl a neighbourhood with scanners to spot future prey. Currently, they may use their cell phones as scanners to read the value of their victims' possessions through a window. In the not so distant future, they may not even have to leave their dens to do that; they simply use the Internet for that purpose. Luckily, at the moment of writing, this is still a science fiction fantasy.

Referring back to the privacy-related concerns or challenges presented at the beginning of this chapter, the final item on the bulleted list was "potential introduction of a new, epoch-making person identification system." RFID tags are well suited for that purpose, particularly when fitted under the carrier's skin. Its current value as such, however, is only as good as the installer's reliability. But in the long run, there is no doubt that personal identification will be a central factor in the Information Society, to the point that it will be the main task of neural networks.

All the examples on the potential misuse of RFID technology point in one direction: we must change our approach to it. Attention has thus far been focused on the smart tag component, now we must turn the tables and concentrate on the readers. Smart tags can, after all, be deactivated or erased, but how dangerous can readers be, especially those installed in cell phones?

## SURVEILLANCE TRANSLATES INTO PRESSURE

Mere knowledge of the existence of RFID tags is enough to make people feel uncomfortable; not many people cherish the idea of being constantly watched (Kajava, 1999). A good example of similar effects produced by a simpler technology is provided by traffic cameras. If new technology is to be introduced for monitoring or surveillance purposes, there will be a lot of resentment, unless an effort is made to alter the public's perception of the system's function. Traffic cameras, for example, are often experienced as a way of controlling drivers, not as a means of increasing traffic safety. The same applies to any type of monitoring. Security professionals have always emphasized the use of security functions to enhance overall security. By avoiding difficult situations, it is possible to steer clear of trouble, but an even stronger effect is achieved by the deterrence function. If someone performs a forbidden activity, they know that they will be caught and punished. A situation with transparent surveillance is one in which an electronic (or other) system is in charge of monitoring a place, but the system is superintended by humans, who can intervene and deal with problem situations (Kajava & Varonen, 2001). A case in point is a video recording surveillance camera covering a work station.

Inexpensive RFID components will be strewn in various places in our environment to serve a variety of applications. They will not solve current problems per se, but they will usher in a new networking ideology based on self-organizing ad hoc networks (Savola, 2004). Also smart tags themselves will undergo some form of evolution, from today's passive components to independent computing devices, albeit with a lower capacity than computers. Potentially constructed using paper-machine technology, they push the door wide open for ubiquitous computing.

With the advent of RFID technology, surveillance is also becoming a ubiquitous function. And as the information security dimension will be omnipresent, carriers of

identification tags stand to lose a large portion of their privacy. It may be doubted, however, whether even this development will bring about a perfectly secure or safe society. The basic paradox is that it is highly unlikely that more than a small percentage of employees actually ever even consider engaging in an illegal activity. Professional criminals often have a completely different background and are less susceptible to such surveillance. For example, criminals know how to break the data protection systems of typical end-users. Thus, the function of such systems is actually to protect the data of one employee from other employees. Hackers can always work their way around protection schemes.

Should surveillance through the use of RFID tags become a reality at the predicted scale, business life and society at large would be permeated by surveillance technology. One justification for this trend is that humans are the weakest link in the security chain. The existence of one susceptible person in a company may compromise the entire organization's security strategy. In our day and age, any large organization is quite likely to have on their payroll at least one employee, who is unpredictable in this respect, through the use of drugs or otherwise. This would seem to offer a fairly strong justification for installing stronger monitoring policies.

## CONCLUSION

Introducing RFID technology encompasses a host of unforeseeable consequences, some for the good of society, others rather less so. International commerce sets such high demands that the price of RFID tags must necessarily be very low. This will serve to extend their application range far beyond business logistics. And therein lies the promise and the threat of this new technology. RFID tags can be used to provide information on the product, including price, user instructions, and so on, but they can also be used for more sinister purposes, such as oppressive surveillance by retailers, marketers, and manufacturers.

Measures have been suggested to counter the ill-effects of this new technology, including government regulation, use of tags with an opt-out capability (or, alternatively, opt-in capability) and blocker tags.

We set out to explore the effects of a new, inexpensive technology, and particularly its dark side from the viewpoint of personal security and privacy. It seems that the road of exploration has taken us to a largely uncharted territory, which may even turn out to be the outskirts of the real Information Society. Getting there, however, requires solving the problems associated with one of the key technologies of the future: RFID.

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## KEY TERMS

**Information Security:** Securing data and information in terms of confidentiality, integrity, and availability (CIA model).

**Privacy:** Right of individuals and organizations to control the collection, storage, and dissemination of their information or information about themselves.

**RFID:** Radio frequency identification.

**Surveillance:** Careful watching of a person or a place, usually because a crime is expected or has happened.

**Tag:** Multilaminate structure that houses RFID electronics.

**Traceability:** Ability to review in retrospect what happened during an activity.

**Ubicomp:** Ubiquitous computing, or ever-present computing; making computers available throughout the physical environment.

**Usability:** Extent to which users are able to access data and information.

# Radio Frequency Identification Technology in Digital Government

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## INTRODUCTION

Following technical strides in radio and radar in the 1930s and 1940s, the 1950s were a period of exploration for radio frequency identity (RFID) technology as shown by the landmark development of the long-range transponder systems for the "identification, friend or foe" for aircraft. Commercial use of RFID appeared in the 1960s, such as electronic article surveillance systems in retail stores to prevent theft. The 1970s were characterized by developmental work resulting in applications for animal tracking, vehicle tracking, and factory automation.

RFID technology exploded during the 1980s in the areas of transportation and, to a lesser extent, personnel access and animals. Wider deployment of RFID tags for automated toll collection happened in the 1990s. Also, there was growing interest of RFID for logistics and having it work along side with bar codes. In the beginning of the 21st century, the application of RFID technology has been ubiquitous and now it is practically part of everyday life (Landt, 2001).

## BACKGROUND

Similar to bar coding, RFID tags provide information about goods, products, conveyances, animals, and people in transit. However, unlike bar coding which tracks product lines, RFID technology uses radio frequencies to automatically detect individual units and the information about these units. Use of radio frequency eliminates line-of-sight requirements and permits wireless detection.

RFID offers a number of advantages over the current bar-code technology which uses universal product codes (UPC). Codes in RFIDs are long enough so that each tag may have a unique code whereas a specific line of products are limited to a single UPC code. The distinctive nature of RFID tags results in an object that can be individually tracked as it moves from location to location. For product items, this characteristic can help retailers reduce theft of specific units and other forms of loss. Although functionalities provided by this technology far surpass those provided by bar coding, it does not mean that RFID will replace bar codes because of cost considerations.

RFID technology ensures better inventory control which leads to improved supply chain operations. The U.S. Department of Defense (DOD) has required its roughly 40,000 suppliers to put RFID tags on pallets and cases as well as on single items costing $5,000 or more beginning January 1, 2005. Wal-Mart has required that its top-100 suppliers provide the tags by 2005 for tracking merchandise, materiel, and goods.

RFID technology extracts information from tags, also known as transponders, wirelessly and automatically. Consider an arrangement of antennas connected to reader, which in turn is connected to a computer. When a tag enters the radio frequency field, it derives power from radio frequency signal. This energy allows a tag to transmit data, typically an identity, often in the form of an electronic product code (EPC). Unlike bar codes which tell you that a carton contains product XYZ, EPCs can specifically identify one box of product XYZ from another box of product XYZ.

This information is fed to a reader via the antenna. The reader interprets the information and translates it into binary format before relaying it to the connected computer. The computer can perform an action based on data received—this could be simply identifying existence of an item or adding or deleting it from its inventory. In some cases, the computer can also send a message back to the tag (Shahi, 2004).

RFID technology has clearly emerged as an approach to support e-government strategies aimed at improving citizen services, security operations, government-to-business interactions, and internal government operations. This article explores the potential of RFID technology in achieving quantum-level improvements in the realm of digital government particularly at the federal sector.

## APPLICATIONS OF RFID

Applications of RFID technology were researched and actual and potential uses of the technology for digital government were identified and categorized into the following functions:

- Delivery of citizen services

- Security applications
- Business-to-government interactions
- Internal government operations

Applications identified were specifically those that have been or can be implemented by a government entity including the military.

## Delivery of Citizen Services

### Improving Drug Safety

The Food and Drug Administration is investigating attaching RFID tags onto pharmaceutical drug labels. These tags will help pharmacists and technicians find where on the shelf a drug is stored and the length of time the drug has been there. This system can also help when there are drug recalls and for verifying expiration dates (Sun Microsystems, 2003).

In another application, RFID tags are being embedded in lids of medication bottles and vials to ensure patient medication compliance. The RFID can be programmed to remind the patient when the next dose is due and tracks and records the time the patient opens the bottle to remove the tablet or capsule. The data can then be retrieved by a reader for review by the physician, researcher, or pharmacist. This approach can be applied to Veterans Administration hospitals, military hospitals, and other government medical facilities (Information Mediary Corporation, 2004).

### Reducing Traffic Congestion

Toll facilities operated by state government transportation agencies are equipped to read RFID tags mounted on vehicles. Examples of electronic toll collection systems include Virginia's SmartTag system, the EZ-Pass system in the northeast United States, and California's FasTrak system. The tag is linked to a prepaid replenishable account that is debited when paying the toll. These tag-equipped vehicles no longer need to stop and pay the toll, thereby reducing traffic congestion at these locations.

### Improving Postal Services

RFID tags can be used to improve the flow of mailed packages. An RFID-enabled conveyor system was developed that is able to sort packages with 100% accuracy and at a speed of 200 packages per minute. This success shows that RFID can be used instead of bar codes for this type of operations (Collins, 2003b). Also, the U.S. Postal Service is investigating the placement of RFID technology on postage stamps in order to track and locate mail quickly (Sun Microsystems, 2003).

### Preventing Auto Theft

German companies developed a holographic windshield label that will make it difficult to conceal the identity of a stolen car. The high-security windshield label is difficult to counterfeit because of the hologram technology. This label allows police to view electronic data verifying the ownership and operating status of a vehicle. If a criminal attempts to transfer a label to a stolen car, the RFID label is disabled because the connection between the antenna and chip will be decoupled (Anonymous, 2002a).

### Ensuring Tire Safety

Michelin, the tire manufacturing company, has begun testing RFID tags embedded in tires for tracking purposes to ensure compliance with the United States Transportation, Recall, Enhancement, Accountability and Documentation Act (TREAD Act) in the wake of the Firestone and Ford Explorer fiasco. The Act requires carmakers to closely monitor tires starting with the 2004 model so the tires can be recalled promptly if a problem occurs (Anonymous, 2003a).

### Improving Transit Operations

Washington, DC's public transit system uses an RFID-based smart-card system called SmarTrip. Used by more than 360,000 of its Metrorail travelers, a card-carrying passenger can stroll by a reader at the entrance kiosk of one station and the value of the card is displayed. When it is scanned past the exit kiosk of another station, the cost of the trip is automatically calculated and deducted from a prepaid account. This helps the passenger avoid waiting in line for purchasing paper fare cards. These cards can also be used to pay commuter parking lot fees and bus trips within the regional network.

In Bogotá, Colombia, 23,000 transit buses carry RFID tags ensure that the buses are distributed throughout the city and avoiding congestion located at major thoroughfares (Collins, 2004e).

### Improving Highway Safety

The Federal Highway Administration is looking at using RFID technology in its goal to reduce road fatalities in the United States by 50%. The agency has funded companies to develop dedicated short-range communications (DSRC) technology, a complement to RFID systems, for issuing

alerts to drivers about impending intersection collisions, rollovers, weather-related road hazards, or warning a driver that his or her vehicle is going too fast to safely negotiate an upcoming curve. This high-bandwidth technology can also be used for downloading road maps and a possible replacement for automatic toll collection systems (Collins, 2004b).

### Improving Food Safety

One of the futuristic uses of RFID tags has been its capability to work with "smart" appliances. For example, RFID technology will allow a refrigerator to track the expiration dates of the food it contains and notify its owner when it does expire. This is an area that may be of interest to the Food and Drug Administration for ensuring food safety at commercial sites (Brown, 2002).

### Facilitating Financial Transactions

The use of RFID technology to facilitate payments can be used at government-operated recreational areas and parks, museums, food concessions, and other government-sponsored facilities. The private sector has been pioneers in this area with their novel applications of tag technology particularly in retail establishments.

### Improving Luggage Flow

McCarran International Airport in Las Vegas is applying RFID tags as part of its effort to overhauling its baggage-handling systems to support federal security regulations and reduce incidences of lost baggage. The system which currently uses bar-coded labels is expected to improve in terms of expediting the flow of baggage using RFID (Joachim, 2004).

## Security Applications

### Access Control

Many buildings and other secure locations are using contactless RFID tags as physical access cards. Often in the form of smart cards, these credit card-sized systems contain a microprocessor embedded in it.

### Anticounterfeiting

The Internal Revenue Service is investigating embedding RFID tags into currency to reduce counterfeiting. In addition, euros may get RFID tags to stop counterfeiting. These tags will also have the ability of recording data such as details of the transactions involving the subject paper note. This would prevent money laundering, track illegal transactions, and also prevent kidnappers demanding unmarked bills (Sun Microsystems, 2003).

### Personal Identification

China will issue over a billion RFID-based personal identification cards to each of its citizen. Three million handheld RFID readers would be issued to the police to give them the ability to scan the information contained in the cards (Winer, 2004).

Another way personal identity can be ascertained is through VeriChip, a small RFID chip about the size of a grain of rice. Each VeriChip contains a unique identification number which is used to access a database consisting of personal information. It is implanted just under the skin not unlike receiving a shot and it is scanned with a scanner. Because of this approach, the developers claim that the VeriChip cannot be lost, stolen, misplaced, or counterfeited. This chip can be used for personal identification. In October 2004, the Federal Drug Administration approved the device to give medical personnel instant access to patient records (Feder, 2004).

### Livestock Tracking

Vermont Senator Patrick Leahy told a Georgetown University audience that he had firsthand experience with RFID technology from his own involvement in a Vermont pilot program tracking cattle to thwart outbreaks such as mad cow disease (Swedberg, 2004).

### Improving Port Security

Pilot studies are being conducted that test RFID technologies in combination with satellite tracking systems, gamma ray image scanning devices, and Web-based software to make sure containers at U.S. ports hold what they are supposed to contain (Rosencrance, 2002).

### Making Children Safe

RFID tags embedded in wristbands have been used in various amusement parks in the United States and Europe to track the location of children. Parents who can rent these wrist bands for their children can locate their children to 5 feet of their actual location using a distributed network of sensors. This child-tracking system relies on a combination of active RFID tags and Wi-Fi access-point triangulation (Anonymous, 2004e). This approach can be used at government-run facilities frequented by children such as art galleries, museums, and zoos.

### Improving Firearm Safety

A Belgian subsidiary of the firearm company, Smith and Wesson, implemented a RFID firearm system which would make a firearm operational only to the individual implanted with a corresponding microchip (Gossett, 2004).

### Detecting Counterfeit Drugs

The Food and Drug Administration recommended the use of RFID technology to create a "pedigree" for a drug—a secure record documenting that the drug was manufactured and distributed under safe and secure conditions. The agency predicts that RFID can be used to track all individual drugs by 2007 (Food and Drug Administration, 2004).

### Tracking Inmate Movements in Prisons

RFID technology promises to locate prisoner movements in real time. At the Ross Correctional Facility in Chillicothe, Ohio, inmates wear wristwatch-sized transmitters that track them within the prison. These devices can also detect whether prisoners have removed them and can send an alert to prison computers (Best, 2004).

### Securing Library Books

San Francisco Public Library system approved plans to tag library books with RFID chips to prevent theft of the books and track its use (Stanley, 2004).

## Business-to-Government Interactions

### Improving Supply Chain Management

RFID technology promises improved product availability and reduce processing costs. Private sector retailers Wal-Mart, Target, and Albertson are mandating its suppliers to put RFID tags on cases and pallets. The DOD is requiring suppliers to place passive RFID tags on pallets and cases starting in 2005. As an incentive to suppliers that tag their shipments, the agency is introducing a fast-track billing process enabled by the faster processing of deliveries (Collins, 2004c).

### Tracking Airline Parts

The Air Force and the Federal Aviation Administration might want to consider what Boeing and Airbus are planning to do with RFID technology. These two major airline manufacturers are initiating a number of forums for customers and suppliers to prepare the airline industry for the use of RFID technology to identify major airplane parts (Roberti, 2004a).

### Improving Asset Management in Hospitals

Managers in military hospitals and other government medical facilities may want to look at RFID-based asset-management solutions. One RFID provider will tag and track 10,000 pieces of mobile medical equipment at three Virginia hospitals (Collins, 2004d).

### Tracking Vehicles in Secure Areas

A new RFID-enabled yard management system is being developed that will let operators of shipping yards and quarries automatically track vehicles as they enter, travel through, and exit facilities (Maselli, 2004).

### Tracking Containers

A provider of wireless asset-management systems is integrating optical character recognition technology with RFID tags to replace the manual processes terminal operators now use to track the container from ship to terminal and vice versa. The provider expects to process a container more efficiently, at a higher volume and with lower costs (Anonymous, 2003b).

## Internal Government Operations

### Tracking Wounded Soldiers

RFID technology was used for tracking wounded soldiers who were involved in the war in Iraq. The U.S. Navy's Fleet Hospital in Pensacola, Florida, tested a system involving RFID wristbands which store the soldier's identification and medical information regarding his or her condition and treatment as he or she moves from the battlefield to a hospital. The U.S. Navy is also using RFID technology to track the status and location of prisoners of war, refugees, and others arriving at the hospital (Anonymous, 2003).

### Tracking Combat Rations

The Department of Defense simulated the tracking of combat rations throughout the entire supply chain from "vendor to foxhole." The agency showed how data could be aggregated and encoded on a special tag with a temperature sensor for the quality control of the combat rations (Anonymous, 2004c).

### Improving Internal Services Management

The U.S. General Services Administration mandated RFID technology to assist in managing data on government buildings, fleets of cars, and products. The driving factors are cost reduction and improved efficiency. The agency intends to cut cycle times and provide rapid response to customers through the use of this technology (Sun Microsystems, 2003).

### Tracking Media

Government agencies have a tremendous storehouse of media that it must track for retrieval purposes. Playboy TV is deploying RFID to track master tapes at its British headquarters where tapes are edited for broadcast over the English and European cable and satellite networks. Tracking tapes in the library used to be a difficult task at Playboy—they spent hours searching for tapes throughout the building. By tagging each of its 11,000 videos, Playboy is experiencing highly reduced search times (Collins, 2003a).

## ISSUES

With the implementation of any new technology, issues can arise stemming from its use. RFID technology is no exception. This section will focus on four key concerns surrounding the tags—privacy, system reliability, interoperability, and cost.

### Privacy

The issue of privacy revolves around retail use of RFID technology. There is concern that RFID tags affixed to consumer products remain operational after the purchase of the product. Although intended for short-distance use, these tags have the potential of being interrogated from great distances by someone with a high-gain antenna, thereby allowing, for example, the contents of a house to be scanned at a distance according to some experts. Therefore, key concerns involve the consumer not being aware of an affixed tag, the consumer not being able to deactivate the tag, and the capability of reading the tag at a distance without the knowledge of the consumer. If the purchased item was paid by credit card, theoretically it would be possible to link the items purchased to the consumer's identity.

German retailer Metro came under fire by privacy advocates who discovered that RFID tags were embedded in the store's loyalty cards. They also found that RFID tags on products sold at their store cannot be completely deactivated after purchase. "Customers are misled into believing that the tags can be killed at a special deactivation kiosk, but the kiosk only rewrites a portion of the tag, while leaving the unique ID number intact." Outraged German citizens were demanding that Metro put an immediate end to the trials (Associated Press, 2004).

Privacy groups such as Consumers Against Supermarket Privacy Invasion (C.A.S.P.I.A.N) are trying to get legislation introduced into Congress to outlaw RFID tagging. Others are applying market pressures to encourage businesses to behave responsibly.

Government is responsible for maintaining the public trust of the citizens. If the government uses RFID tags in ways that violate of privacy standards, public trust is breached and there will be considerable ramifications.

### System Reliability

Some observers indicate that antitheft RFID systems are capable of being set off by odd things such as items of personal electronics or bits of metal. One claim was that a child activated these systems because he happened to generate the exact frequency of electromagnetic energy.

Early applications of RFID technologies were not successful. Early tests conducted for the Department of Defense showed that tags on liquid-filled containers could not be read reliably but this problem has been corrected. Tagging liquid-filled containers (such as cartons of bottled water or shampoo) is still a challenge but tags that will work on virtually any surface or container are now available (Anonymous, 2004c).

Practitioners have identified other problems with RFID technology. There is considerable delay when an encoded tag cannot be read. Some imply that it is not ready for high-volume processes yet. There are also middleware issues that need to be addressed in order that the RFID tag system to be compatible with the database management system (Sliwa, 2004).

Activists against the technology state that RFID could be bad for health reasons. In a future world where RFID readers are ubiquitous, people would be continually bombarded with electromagnetic energy. The long-term health effects of chronic exposure to this constant energy are not clearly known to researchers (Anonymous, 2003b).

### Interoperability

Based on interviews with senior executives across the globe, the system infrastructure presented by the diverse and competing RFID vendors are often incompatible. Many countries have not agreed on common standards, frequencies, and power levels for RFID tags and readers (Collins, 2004c).

Significant differences in the numbering scheme for the RFID tags have surfaced. The EPCglobal, the industrial consortium for RFID technology, envisioned that all companies would use a single EPC numbering scheme. However, the DOD, the biggest customer migrating to RFID technology, prefers using its "Unique ID" numbering system accepted as one of the EPC standards. Other industries are also seeking to use their own unique numbering systems so that companies within those industries will not have to spend much to modify their software systems (Anonymous, 2004d).

One of the biggest challenges involves integrating the data received by the RFID with an organization's backend systems. This occurred to 7-Eleven when the company piloted an effort to use a RFID stored-value card inside the corporate headquarters in Dallas and at a store in Plano, Texas (Levinson, 2004).

### Cost

Companies are also concerned about the cost of RFID tags and how much they will have to spend to comply with mandate such as those posed by Wal-Mart and the DOD. A related question is how to allocate the cost of deploying RFID systems and tagged products among the different players in the supply chain (Collins, 2004d).

The cost of the tag is roughly $0.50 to a dollar; many in the industry say that the price must come down to $0.05 for it to be economically viable (Carroll, 2004).

## FUTURE TRENDS

RFID, as with many other technologies, proceeds through a maturation cycle. It is now being overhyped as the solution to many problems. It may not prove to have a place within an organization's infrastructure, culture, or financial budget.

Nonetheless, it is exciting to see the number of actual and potential ways this technology can help in improving and streamlining business processes. The future looks very bright for RFID technology. For example, RFID promises to bring a new level of usability and functionality to cell phones. By inserting an RFID reader into the unit, it will allow mobile services, ticketing, payment transactions, and exchanging business cards by simply touching two cell phones together. Employees can send real-time attendance logs and automate routine reporting tasks over the cellular network.

## CONCLUSION

As this technology matures, sufficient attention must be made toward the issues identified here, namely, privacy, system reliability, interoperability, and cost. People need to feel confident that their personal privacy is protected whenever RFID tags are used and that information is not being distributed to unauthorized parties. People need to know that RFID systems are reliable enough for mission-critical applications such as financial transactions. Instead of a multitude of incompatible standards, there needs to be a common basis for RFID systems to work with each other without going through tedious effort. The RFID tags should be economical so that they could be used on a widespread basis and offer substantial value to both businesses and ultimately consumers.

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## KEY TERMS



**Active Tag:** A tag with a power source such as a battery that can be used as a source of energy for the tag's circuitry and antenna.

**Bar Codes:** A collection of lines of different weights and spacing that can be read by a computer input device.

**Passive Tag:** A tag that does not have a power source such as a battery. Power is supplied by the reader. When radio waves from the reader meet a passive tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from the field and energizes the circuits in the tag. The tag next transmits the data encoded in the tag's memory.

**Reader:** A device which is capable of "interrogating" or reading data from a tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data.

**Tag:** A portable device which is capable of receiving data from or transmitting data to a reader. It holds a microchip combined with an antenna in a compact package. The antenna picks up signals from an RFID reader or scanner and then returns the signal typically with some additional data. RFID tags can be very tiny such as the size of a large rice grain or as large as a paperback book.

**Transponder:** A combined receiver and transmitter whose function is to transmit signals automatically when triggered by a reader or an interrogator.

**VeriChip:** An implantable radio frequency identification (RFID) microchip for human use.

# Record Keeping for Digital Contracts

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## INTRODUCTION

A challenge in electronic commerce is to keep proper records of business contracts made over the Internet. A common type of contract is a purchase order that a buyer places on a vendor using the Web or a private network. The government has to step in to adjudicate disputes if and when they arise. It is in the public's interest, therefore, that formal and indisputable methods are developed for recording contracts digitally.

On June 30, 2000, the Electronic Signatures in Global and National Commerce Act (E-sign Act) was passed in USA, and it legalized electronic signatures in contracts. This paved the way for the rapid growth in electronic commerce which is estimated to be $3.2 trillion in the USA (Freeman, 2004). With this sizable business, it is very likely that disputes involving electronic contracts arise.

In this article, we suggest a few models and processes for creating and storing authentic contract documents so that future disputes can be settled more effectively.

## BACKGROUND

Disputes could be about any aspect of a contract. They could be about the quantity, the price, or the quality of the product or service stated in the contract. In the former case, the dispute may concern the exact wording of a clause in the contract. If the contract is in digital format, then we have to make sure that the contract has not been altered by any of the parties. In a hard copy, alterations can be easily detected, but in a digital format, alterations can be difficult or impossible to detect. One way, almost an ideal way, to avoid alteration is to use digital signatures (Anthony, 2004; Freeman, 2004; Landau, 2000). A digitally signed electronic document cannot be altered or forged. The scheme will work as follows: The buyer sends a digitally signed purchase order, usually with an expiration date, to the seller which declares the buyer's offer to pay for the goods or services mentioned in the order. When the seller accepts the order, the seller digitally signs and dates the order that is already signed by the buyer. The seller then sends a copy of the doubly signed document to the buyer. Now both parties have a doubly signed unalterable document and there can be no dispute about the content of the contract. This scheme is practicable when both parties are rich enough to possess public keys necessary for digital signatures. In practice, though, the buyers of consumer products such as personal computers may not have public keys and will not be able to sign documents digitally. Yet, they would like to be able to place purchase orders over the Web without fear of fraud. Also, the seller, usually a large corporation, should be able to accept as many orders as possible without fear of dispute.

Another case is a large buyer who purchases many types of products from many small suppliers. In this case too, a third party can keep the records of all contracts so as to minimize disputes.

In this article, we provide a few approaches to generate and store electronic contracts between a customer and the business. These approaches differ in the following aspects: average dollar worth of the sales transaction, likelihood of default or a lawsuit, and the technical infrastructure with which the business operates.

## MAIN FOCUS OF THE ARTICLE

In this section, we present a few models in which a third party stores the contracts so as to minimize the chances for disputes. The third parties may be certified by some governmental authority, or an international authority, so that credibility of such an entity is established. To avoid the need for additional governmental expenses, existing trade authorities can be entrusted with this task of certifying third parties.

## Single Seller, Multiple Buyers

In this scenario, a large seller receives orders from thousands of buyers digitally, say, through a secure Web page created for the purpose at the company's Web site. After the product is delivered against an order, it is possible that the buyer disagrees about some aspect of the order. To minimize such complaints, the seller hires a third party to receive and store the contracts. The steps involved in this scenario are:

1. The seller publicly announces products and prices, on its official Web site
2. A buyer places a purchase order which is received by the third party, rather than the seller
3. The third party sends the order to the seller and gets it digitally signed by the seller
4. The third party sends the digitally signed copy to the buyer
5. If the buyer accepts it, the buyer makes the payment, usually through a credit card authorization
6. The third party stores the digitally signed purchase order and the buyer's credit card authorization for a predetermined length of time, so it can be retrieved in case of dispute

## Single Buyer, Multiple Sellers

A large buyer such as a manufacturing company may place purchase orders on hundreds of suppliers for thousands of materials. Suppliers could be in different countries. The buyer hires a third party to store the contracts in order to minimize disputes. The steps involved in this scenario are:

1. The buyer sends a digitally signed purchase order to the third party
2. The third party sends the digitally signed order to the seller
3. If the seller accepts the order, the seller sends an acceptance notice and a credit card authorization for payment to the third party
4. The third party stores the contract and the acceptance notice with credit card authorization for a predetermined length of time, so it can be retrieved in case of dispute

## Call for Quotes

In this case, the buyer calls for quotes for a project from many potential contractors. Usually, a deadline for submitting quotes is specified, the quotes are sealed, and all quotes are opened at once at a predetermined time. Disputes can still arise about some aspects of a quote. The buyer can hire a third party to receive and process the quotes so as to minimize the chances of disputes. The steps here are:

1. The buyer announces a Call for Quotes at an official Web site
2. Contractors send their password-protected quotes to the third party, and receive an acknowledgment of receipt. (A pdf file of the quote can be password protected reliably). Contractors who have public key facility may digitally sign their quotes for added security
3. Contractors communicate their passwords to the third party at a predetermined time, so that their quotes can be opened
4. The third party communicates all quotes to the buyer, and stores them for a predetermined length of time

## Government-Hired Third Party

Sale of real estate and automotive vehicles are required to be registered with the government. For economic reasons, a government may hire a third party to store sales documents in a way that is amenable to public access, or protected access by authorized parties. The steps here are:

1. The buyer and seller both pay a fee and ask the third party for a document to be stored according to government specifications. Payment of fees is taken as acceptance of the document version
2. The third party stores the document for a predetermined length of time and provides public access to it via a Web site. If the document is to be protected in such a way that only those with a password can access it, the third party implements such protection

## Independent Third Party Service

In this model, a document that involves two or more parties is stored by the third party for a fee. Payment of the fee is considered acceptance of the document version by all parties. The steps here are:

1. The third party announces its services via a Web site
2. Each of two or more parties pays a fee to the third party to store a document for a predetermined length of time with password protected access. One or more of these parties may digitally sign it for further security

3. The third party stores the document with password protected access via its Web site

## FUTURE TRENDS

A fundamental requirement of the proposed models in this article is the use of a third party whose authority is well established. Just as Key Distribution Centers (KDC) are authenticated in the practice of public key cryptology (Koblitz & Menezes, 2004), the third parties in the models above are to be authenticated by a governmental body. Indeed, a KDC itself can serve as a third party to store commercial contracts. Additionally, governmental trade regulatory authorities can be entrusted with the task of certifying third parties.

A second important aspect of the models is the use of digital signatures. Many improvements are taking place in this area, the most promising one being quantum cryptography. While current algorithms such as RSA (Rivest, Shamir, & Adleman, 1978) or DES (NIST, 1993) have been secure so far, they are not guaranteed to remain so in the future. A breakthrough in the theory of computation or a leapfrog improvement in the speeds of computers could thwart current algorithms. On the other hand, quantum cryptography is based on objective uncertainty and therefore is not subject to the same threats (Bennett, Brassard, & Ekert, 1992).

It is also possible to use the emerging schemes for multi-signature and proxy signature for creating and storing secure documents (Hsu, Wu, & He, 2005). Such schemes can reduce the number of steps involved in the processes described in this article.

Further improvements to the Internet and telecommunication can strengthen the models suggested in the article, due to better and more secure access to the Web.

## CONCLUDING REMARKS

Business-to-customer information systems process orders electronically without much manual intervention. Processing such orders usually involves a legal contract between the business and the customer, which confirms that both parties agree to the terms and conditions of the transaction. This contract needs to be captured and electronically saved by some agent so that any disputes that arise later can be properly addressed. Currently, the business itself is carrying out this process. This practice is unsatisfactory not only because it is unilateral, but also because there are no standards for fraud-free record keeping. Lacking a standard, each business has devised its own way of generating, and storing the contracts. Not even a set of guidelines for systematic generation and storage of electronic contracts exists.

In this article, we have presented a few models for generation and storage of electronic contracts. These models involve cryptology, digital signatures, and authentication. Business managers can devise suitable strategies for managing their contracts based on how the model parameters apply to them.

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## KEY TERMS

**Data Encryption Standard (DES):** A Federal Information Processing Standards (FIPS) approved cryptographic algorithm for encrypting and decrypting text.

**Digital Signature:** A method for authenticating digital information using public key cryptography.

**E-Sign Act:** Refers to the Electronic Signatures in Global and National Commerce Act passed in 2000 by the U.S. Government that legalized digital signatures.

**KDC Authentication:** The process by which the integrity of a Key Distribution Center (KDC) is established.

Usually carried out by a governmental body, the authentication enables the use of public keys.

**Key Distribution Center (KDC):** A facility that generates and distributes public and private keys for encryption and decryption.

**Public Key Cryptography:** A scheme that allows users to communicate securely without having prior access to a shared secret key, by using a pair of cryptographic keys, designated as public key and private key,

**Quantum Cryptography:** An encryption/decryptions scheme which uses the objective uncertainty of quantum properties of subatomic particles and therefore expected to be secure forever. Current public key cryptography, on the other hand, relies on intractable mathematical problems, and may become insecure in the future.

# Regulatory Ontology–Based Interagency Information and Service Customization

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## INTRODUCTION

The government services needed by citizens or businesses often require horizontal integration across autonomous government agencies. The information and services needed are typically scattered over different agencies in diverse formats, and therefore are not interoperable. This results in the so-called "stove-pipe" service and information paradigm, which raises a number of challenges. First, the service consumers, both citizens and businesses, face the challenging task of locating relevant services and information from a large number of documents scattered at different locations on the Web. Therefore, it is beneficial to have a system to locate and integrate available services that are tailored to individual preferences and needs according to regulations. Second, due to the fact that information is not shared among the different agencies, service consumers are required to reenter certain data repeatedly to obtain interagency services. Service integration should allow sharing among agencies.

Digital governments have been evolving with different focuses in terms of information and transaction services. The evolution has shown at least four different stages. At the first stage, with the Internet and the WWW, governments digitized paper forms and started to disseminate information with static Web pages, electronic forms, and data displays. The focus of this initial stage has been to make information digitally available on the Web. The transaction services tended to resort to off-line paper-based traditional methods (e.g., by submitting the printed form with a payment) such as by credit cards.

In the second stage, governments started to provide services for the citizens by developing applications for service delivery and databases to support the transactions. The citizens and businesses can "pull down" the needed services and information through "active" interaction with individual agency Web sites separately, as in self-services. In both of these stages, the digital government efforts did not consider what other government agencies have been doing and how their services may be related to other agencies' services. The information and service consumers need to "visit" each agency separately and actively search for information and services. The digital government up to this stage mimics the physical government, and citizens and business entities navigate digital boundaries instead of physical boundaries for complex services, such as business registration or welfare benefits. When agency interactions are needed, data and forms are forwarded in batch mode to other agencies through paper or fax, where the data is reentered, or the digital data captured from a form is forwarded in a file via CD-ROM or a floppy disk. The streamlining of business processes within individual agencies may have been achieved, but not the streamlining of business processes across agencies.

In the third stage, digital government agencies strive to provide seamless, integrated services by different agencies with sharing necessary information. The services and documents are organized such that they are easily identified and the consumers do not have to scour large amounts of information for the right ones. This stage of digital government is characterized as one-stop portal stage. In the fourth stage, the governments create digital environments where citizens' participation is encouraged to define government policies and directions. The services up to the third stage are often enforced by government regulations and policies. These very rules and policies can be modified by citizens' participation. In this fourth stage, digital government efforts focus on developing collaborative systems that allow collaboration among government agencies and citizens in order to reflect the constituents' inputs.

Today's digital governments characterized by "self-service" and "one stop portal" solutions, between stages

two and three, need to provide front-end (citizen-facing) tools to deliver relevant, customized information and services, and a back-end (processing) infrastructure to integrate, automate, manage, and control the service delivery. The service integrations vary according to user requirements and need to be dynamically achieved in an ad-hoc manner with personalized processes as end results.

## BACKGROUND

Web-based electronic commerce applications or digital government services applications support the interaction between different parties (customers or citizens) and management of data involved in the process. In Electronic Commerce, integrating a variety of available applications creates value-added services for customers and new business opportunities for providers. The integrated applications allow comparative shopping services where customers have a uniform interface for different stores. The integration of complementary services allows one-stop services, such as airline, train, hotel, and car rental services as one service. The application integration faces a number of challenges, such as diversity of applications, disparity of interfaces, and heterogeneous data and API formats. In addition, the integrated services may be loosely coupled involving different participants, playing different roles, in an ad-hoc manner, involving different flows, and complicating the coordination. Thus, the discovery of available services for flexible customization and coordination is required. There are a variety of technologies and standards for solving these issues.

- **Database Schema Integration:** Heterogeneous data formats in each application need to be integrated for integrating autonomous business applications. ERP solutions such as SAP R/3 or EAI (Enterprise Application Integration) use consolidated common data and message exchange models (e.g., XML) for enterprise-wide and cross-enterprise application integration (Lee, Siau, & Hong, 2003)
- **Middleware Approaches:** Invoke a set of software libraries (components) to locate the needed application components and data. CORBA (Common Object Request Broker Architecture) (Vinoski 1997) is an example. The client makes high-level requests for objects and the CORBA middleware locates necessary components and implementation objects
- **Workflow Systems:** Have been used for interorganizational processes or virtual enterprises where processes span multiple organizational boundaries and are composed of loosely coupled cooperating workflows executed in different organizations (Alonso et al., 1999; Casati & Discenza, 2000; CrossFlow, Georgakopoulos, Shuster, Cichocki, & Baker, 1999; van der Alst 1999). The workflow systems typically include components for the modeling and specification of virtual business processes, their execution, process monitoring and analysis, and message communication among process participants
- **Agent-Based Integration:** An agent is a software module having local decision-making capabilities and intelligence to perform specialized tasks by interacting with users, other agents, and information sources. It communicates with other agents to locate the needed services to fulfill the requests from the user or another agent (Wiederhold, 1992). The information and services are integrated by tasks performed by a set of agents
- **Web Service Composition:** The growing trend for B2B or enterprise application integration is using Web services that are platform independent. Each service is published with a set of descriptors about its input, output and behaviors. A set of XML-based standards is used to describe these Web services (WSDL–Web Service Description Language), to be published in a public repository (UDDI–Universal Description, Discovery and Integration), and to be invoked via SOAP (Simple Object Access Protocol). Individual Web services are composed for integration and customization and can be specified in BPEL (Business Process Execution Language) (Hull & Su, 2004).

Using these technologies, one may integrate the applications, services, and business processes, but putting these services together remains mostly manual. Web service technologies try to automate the service identification and discovery utilizing the Web service descriptors such as input and output matching, which are mostly syntactic descriptors. More semantic and pragmatic approaches may be needed for automatically identifying the needed component services for integration and customization (McIlraith, Son, & Zeng, 2001).

## ONTOLOGY-BASED CUSTOMIZATION

Consider an entrepreneur, John, who wants to develop an open lot to start a new automobile repair shop as follows:

*Scenario: The open lot is located in an environmentally sensitive area near wetlands and a river in the New Jersey Meadowlands designated as "Light Industrial and Distribution B zone."* (HMDC, 1999) *John will have*

*to find out all the relevant permits from different agencies and forms to fill out.*

*He will first visit the Websites of the New Jersey Department of Environmental Protection (NJDEP) to see if the lot falls in a wetland according to the Freshwater Wetlands Map, Tidelands Claims Maps and County Soil Survey of Natural Resource Conservation Service. If the wetland is verified, he needs to know that Army Corps of Engineers Section 10 or 404 Permits are applicable and determine whether NJDEP Waterfront Development Permit, Stream Encroachment Permit, Water Quality Certificate and Riparian Grant are needed. This is in addition to the task of deciding whether the zone-specific permits for the business type need to be obtained from NJMC (NJ Meadowlands Commission).*

*After this, John needs to obtain all business registration-related permits and certificates. He will need to look at Web resources on the business location, business type, and labor relations in order to identify all tasks, such as registration at the Department of Taxation, employer ID service at the Labor Department, and other services from the Division of Commercial Recording, Division of Community Affairs, Department of Environmental Protection, Department of Public Health and Safety, Division of Unemployment and Disability Insurance, Division of Worker's Compensation and others. John has to visit each agency's Web site and extract relevant documents.*

As shown in the scenario, the services provided by agencies for developing and opening a business define an inter-agency process, composed of individual services from each agency, in a way that the services are highly customized to meet the requirements and preferences of a particular individual. The relevant information and services should be automatically identified and gathered from different agency sites and integrated into a logical sequence. The composition of the inter-agency service needs to be dynamic, not static, and automatic rather than manual, to deal with diverse situations and contexts of each citizen.

The determination whether two government services can be integrated or not is often based on government regulations. Our approach is to develop an integrated comprehensive knowledge base of services and regulations for front-end customization tools (Chun, Atluri, & Adam, 2002; Chun, Atluri, & Adam, 2002a) which allows the relevant information to be "presented" according to the citizen's needs and preferences, and a decentralized workflow system for back-end process management (Atluri, Chun, Holowczak, & Adam, 2002) which promotes data sharing, and autonomy of agencies. The regulatory knowledge is represented as *ontology* that is used to automatically generate service integration and customization for the NJ State government and NJMC to deliver services for small and medium size businesses.

## Interagency Service Integration and Customization

The information needed for an entrepreneur differs based on the location (e.g., lot and zones), spatial features of the lot (e.g., wetlands, flood plain), development type (e.g., residential vs. commercial), and business type (e.g., gas stations), etc. The developers need to be aware of the regulations to meet the requirements for opening a new business. This compliance knowledge is captured as a regulatory ontology (Figure 1) where each concept node is associated with relevant regulatory rules. For example, the node "wetland" is associated with a rule (R0 in figure 1) with a condition-action pair (If the lot is within 100 meters of a river, obtain water front permit). The required compliance service "waterfront permit" from the DEP is identified as soon as the lot is identified as wetland. A regulatory rule functions as *actionable knowledge* (i.e., when the condition of the rule is met, the action is carried out). In the new business registration interagency process, the service of obtaining the certificate of incorporation is required for an incorporated business structure (R1 in Figure 1). The resulting customized interagency service is represented as a workflow and presented to the user (Figure 2).

## Regulatory Information Customization

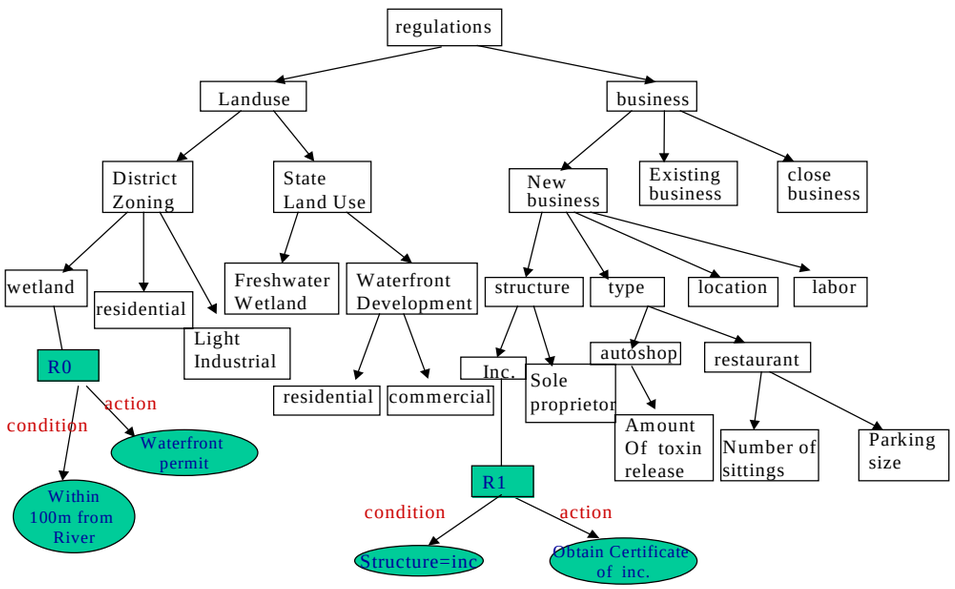
In addition, the regulatory information for a land developer can be customized through the use of the regulatory rules ontology. As the developer chooses one business type (e.g., the permitted zone for the particular business types are presented) (e.g., only commercial and light industrial zones (Figure 3)). A choice of a particular location (e.g., lot 20 in industrial zone) triggers the location-specific regulatory information and presented to the developer to show what rules are relevant. For instance, if the developer chooses a lot near a riverbank, the "Waterfront development regulation" is presented to the developer (Figure 4).

The visualization of customized information and services allows the citizen to have a road map for navigating different agencies. Since the composite interagency service is designed as a workflow built on the Web-based services, the services can be executed one after another by forwarding the relevant data from one agency to another.

## Prototypes

A prototype system, MyNJBusiness, generates an interagency service workflow customized for each business and entrepreneur to register a new business for the NJ

*Figure 1. Regulation ontology*




State government (CIMIC, 2001). This interagency service involves several agencies within the State government such as Office of Information Technology, Department of Taxation, Department of Commerce, Department of Environmental Protection, and Department of Labor, etc. Another prototype system, the Meadowlands Coastal Permitting Assistant (MCPA) (CIMIC, 2003), was developed and deployed at NJMC to customize an inter-governmental permit service that is composed of services from separate government agencies, such as the federal US Army Corps of Engineers, the state government agency NJDEP, the regional agency NJMC, and 14 local governments. The customization system takes user preferences and constraints and tailors their services accordingly.

## FUTURE TRENDS

One of the challenges in our approach is to develop a comprehensive ontology, which requires expertise in the domain. The regulation documents are immense. One approach is to build an ontology semi-automatically using text and other information cues combined with statistical methods (Alani et al., 2003; Degeratu & Hatzivassiloglou, 2002; Gal, Modica, & Jamil, 2004). For a full-blown system, one needs to employ automated text extraction methods. A second challenge is to automate updating of the rules and services. The government environments are dynamic. Each agency implements new policies, services and programs as mandated by law, which requires updates of the ontology systems. Each agency can need to monitor the changes and update the regulation ontology as a new rule becomes available or an old one becomes obsolete (Atluri & Chun 2003; Chun, Portscher, & Geller, 2005).

With the emerging technologies in Web Services (W3C, 2004a) and Semantic Web (Berners-Lee, 2001), especially OWL-S Web Ontology Language for Services (W3C, 2004), Web services can be invoked and dynamically discovered and composed using semantics provided by an ontology. The regulations ontology can automate the dynamic discovery and composition of services in alignment with these new technologies (Chun, Atluri, & Adam, 2005a; Maximilen & Singh, 2004).

## CONCLUSION

In this article, we have addressed the issue of providing customized interagency and intergovernmental information and services. We achieve the customization by using a knowledge base of regulations. The regulatory knowledge scattered in separate agencies' documents and Web pages is modelled with ontology of concepts, classes and subclasses, and actionable rules with conditions and actions. A customization system using the ontology of

*Figure 2. Integrated service workflow*

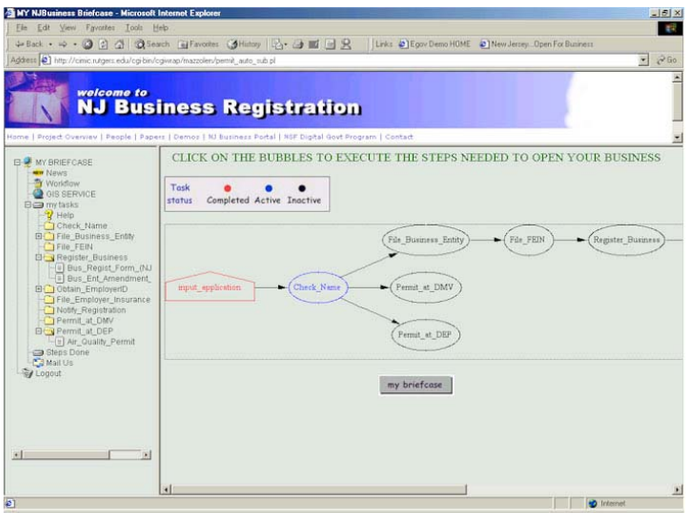
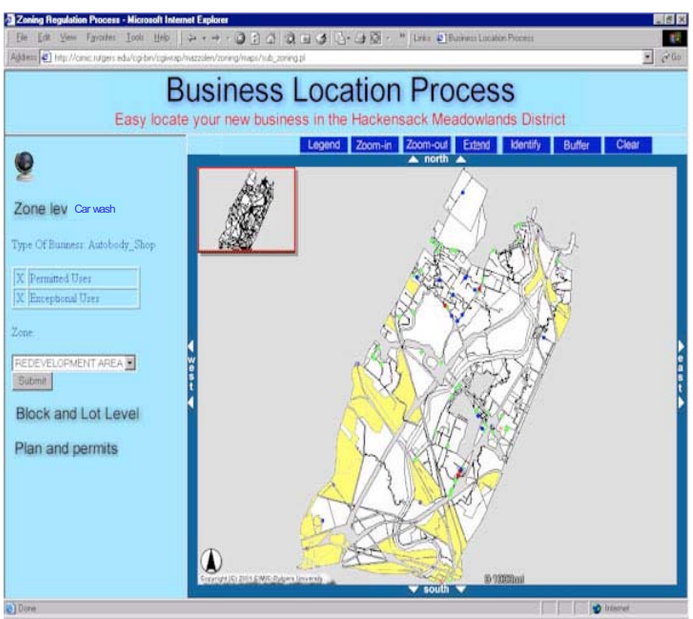



*Figure 3. Customization by zoning rules*




these rules discovers and generates an interagency workflow with information and services tailored to the citizen's preferences and needs and government rules. Online government systems using the regulatory ontologies can automatically achieve seamless integration of individual services.

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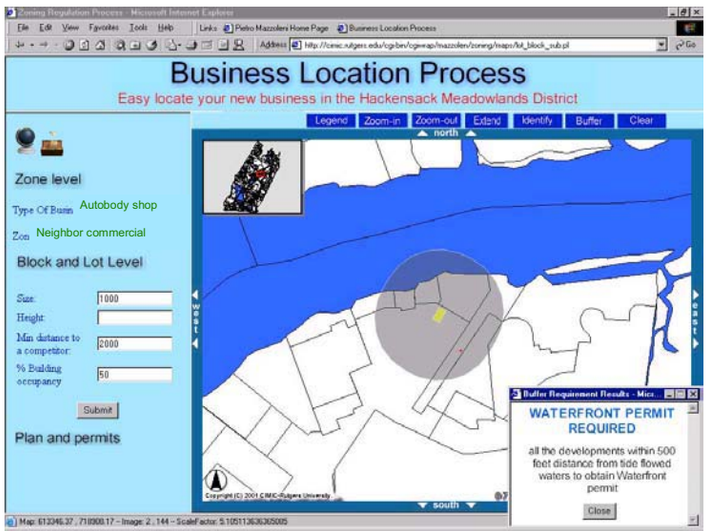
*Figure 4. Customization by waterfront rules*

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## KEY TERMS

**Actionable Knowledge:** Explicit knowledge and information, typically presented in the form of rules, that allows the decision maker or a system to recognize some important relations and to perform an action, such as targeting a direct marketing campaign, or composing an integrated services.

**Interagency Information:** Information or data from multiple agencies, that is required for consuming interagency services.

**Interagency Service:** A government service that is composed of services from multiple autonomous individual agencies.

**Interagency Service Customization:** On-the-fly service integration composed of services from multiple government agencies that are required by the citizen's or business's preferences and constraints.

**Portal:** A Web site that hosts a broad array of resources and services, with personalization, single sign-on, content aggregation from different sources, such as email, forums, search engines, news, weather information, stock quotes, phone and map information and online shopping malls. It provides infrastructure for application systems to seamlessly aggregate and integrate back-end processes and systems, and deliver cross-enterprise services and information. The government portals facilitate the connection with citizens, businesses, employees, partners, and other government entities.

**Ontology:** The study about what kinds of things exist—what entities there are in the universe. It derives from the Greek onto (being) and logia (written or spoken discourse). It is a branch of metaphysics, the study of first principles or the essence of things. In information technology, an ontology is a working model of entities and their relationships in some particular domain of knowledge or practices (hence, domain ontology). Ontology provides a set of concepts and vocabulary in a given domain with a typically hierarchical structure containing all the relevant entities, the relationships among entities and rules that govern the uses of entities. Ontology helps humans and programs to share information and knowledge. Every concept within an ontology hierarchy can be described by assigning attributes–for instance, color is an attribute of concept "car." Attributes allow more complex relations to be modeled–for example, an instance attribute or a class attribute can describe an instance or a class of the concept, respectively.

**Self-Service:** A mode of finding and extracting the needed data and information through direct interaction with Web resources provided by government agencies.

**Stovepipe Systems:** Applications developed to solve very narrow problems within departments or within an organization that are not easy to interoperate with other systems.

**Workflow Management System:** A computer system that manages and coordinates the execution of the flow of work (tasks) among participants, according to procedures (dependencies) among a number of tasks.

# Reusability in Governmental Electronic Services

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## INTRODUCTION

Reusability in the everyday life is the capacity of using existing objects or even concepts again in the same or other contexts. When applied to information systems reusability is the capability of using the same parts of an application in other applications or in other contexts. As defined by IEEE (IEEE, 1990), *reusability* is the degree to which a software module or other work product can be used in more than one computing program or software system. Although rapid application development environments such as MS Visual .NET™ (Visual .NET, 2005) and Delphi™ (Borland Delphi, 2005) have to some extent employed reusability of components to aid the fast implementation of software applications, the extent to which existing objects can be used again in the implementation of new software systems is usually limited to basic building blocks of the interface. One problem that hinders reusability of larger building blocks is the fact that once a component which encompasses a number of objects is built it also encapsulates algorithms (sets of well-defined instructions that perform a task) in the form of code that define the functioning of the component. Tight coupling between the program logic and the program code makes portability of the component between applications difficult, when even small modifications in the program logic are required. A second problem that hinders reusability is that even when the same component can be directly used between applications, recognizing that such a component exists and retrieving it, is not an easy task.

Reusability plays an important role in software development industry. If a set of well-defined components is available, valuable resources can be saved by utilizing again these components. As Rich Seely observes (2003) "as part of that cost-saving message, Gartner recommends vendors and consultants focus on reusability of Web services applications and components."

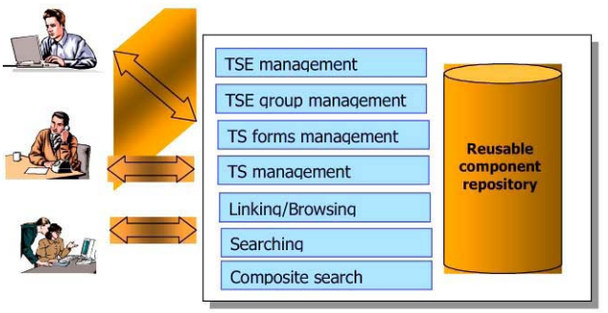
## BACKGROUND

Electronic government is an area where a lot of development effort is lately devoted to. Electronic government aims to promote the use of electronic means, mainly electronic services to facilitate communication and interaction between civilians or businesses and the government. According to the European Commission (European Commission, 2000) "transaction services, such as electronic forms, are perceived as the future of electronic government."

An electronic transaction service is usually the electronic counterpart of an existing service, implementing the business process logic involving the filling and submission of forms containing the necessary data, the processing of these data according to rules derived from laws and regulations and finally the return of a reply to the user.

In order to implement transactional electronic services, the collaboration between a number of experts is required. To this end, reusability can help by minimizing the effort needed for developing online transactional services. Electronic government offers a prominent area for the application of reusability since services offered to citizens from the same or different public authorities have common parts that could be reused between their electronic counterparts. However, in order to have effective reuse of components the two main problems previously described have to be solved. Back in 1995, Dusik and Katwijk (1995) identified the importance of a software development environment in which reuse, in various forms, would be an integrated element. As Gall, Jazayeri, and Klosch (1995) noted, the goal for reusability should be to create a software development process based on the "use" rather than the "reuse" of standard components. The approach used during the SmartGov project (2001) involved the design and implementation of an e-service development environment that would enable developers and domain experts to use components that they or other users had created to create their own transaction services.

*Figure 1. Introducing the reusable component repository*




## SMARTGOV APPROACH

In contrast to simple information services, transaction services allow users to submit their data and in response, the public administration performs a service such as the issuing of a certificate or the tax clearance. Transaction services allow the user to perform common services online, implementing thus one of the main objectives of the electronic government, namely the facilitation of the interaction between civilians and businesses with the public authorities.

To be able to implement reusability effectively, one has to start by decomposing a transaction service to its basic building elements. In the first level, an electronic service consists of a number of forms the user is required to fill in. In the case of short documents, one form may be enough, where for lengthy documents, more than one form may be necessary. A form itself may comprise of several *areas*, and each area commonly contains individual *fields*, which are conceptually interrelated. The term *field* denotes the equivalent of a paper form field, which in the electronic service may be implemented as text input field, selection list, radio button group, etc.

For example, in a tax return form, distinct areas may be dedicated to collecting data regarding the taxpayer's personal details, income, and expenditures. Form fields are the individual elements that citizens need to fill in, either by direct typing of data in the area pertaining to the field (e.g., typing *13765* in the input area of the *Zip code* field) or by selecting one of the available field options (e.g., *Yes* or *No* for the *Do you own the house you live in?* field). Fields usually come complete with *labels* (i.e., descriptions of their purpose on the form). In some cases, the number of fields needed for some purpose cannot be predetermined. As Shaw pointed out (1995), 90% of most applications code goes into system or administrative code, like user interface code and back-end processing. Thus, reusability of objects combining the visual part of the field and the inherent processing logic is crucial. Objects greatly increase software reusability and simplify the software development process (Fan, Stallaert, & Whinston, 2000).

As noted earlier for a reusability approach to be effective two issues have to be tackled: the tight coupling between the logic and the program code (i.e., between what we aim to achieve and the code that implements it) and the implementation of suitable mechanisms for retrieving components. The first issue can be solved by providing facilities to customize components without the need for completely rewriting the program code while the second can be solved by offering mechanisms for locating components pertinent to the tasks at hand and mechanisms for publicizing components to other user.

To facilitate these tasks, a *reusable component repository* is introduced, complemented with tools enabling users to browse, query, populate, and customize its contents. The repository approach is illustrated in *Figure 1*.

In the proposed approach, the idea of a basic building block is introduced. A *transaction service element* (*TSE*) is the equivalent of paper based form field. However, in contrast to a simple field, the TSE has more into it. A TSE can have a multilingual label, the field for inputting data, validation checks for checking the conformity of data to rules, instructions, documentation, or even legislation that applies on the field. The component repository holds *templates of TSEs* and *of groups of TSEs*. The transaction element management (TSE management) facility enables users to create templates of reusable TSEs. A reusable TSE template contains exactly the same information as an individual transaction service element, but is not directly used in transaction services. Instead, users create *instances* of this template and customize it to suit the needs of particular circumstances, since a TSE need not appear identical in all its occurrences. For instance, a TSE representing a person's VAT number may appear in a tax return form as "Taxpayer's VAT number" in the area for personal details, as "Landlord's VAT number" in the section in which housing expenses are declared and as "Employer's VAT number" in the incomes section. Besides the changes in labels, the validation checks associated with each occurrence may need to be customized (e.g., the Taxpayer's VAT number is always mandatory while the landlord's VAT number is mandatory only if housing expenses are declared; the employer's VAT number may need to be verified to correspond to an enterprise, rather than an individual). Once a TSE template has been instantiated and (possibly) customized, it can be used within a form of a transactional service. Note that customization is still possible after the establishment of the link between the instantiated TSE and the transactional service. A similar approach is used for TSE groups (i.e., users create in-

stances of generic TSE groups), which can then appropriately customize for use in services.

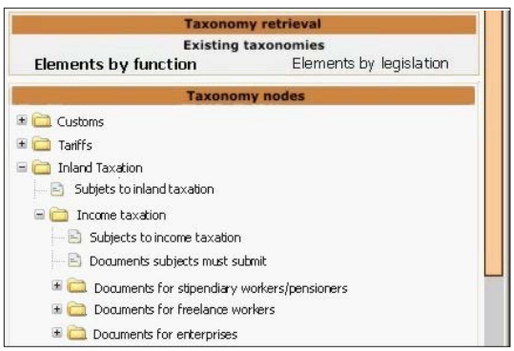
In the approach adopted by SmartGov it was not considered appropriate to introduce the concepts of transaction service form templates and transaction service templates, respectively, since the cases in which whole forms or whole transaction services will be reused are less frequent than the cases in which TSEs or TSE groups will be. Instead, for transaction service forms and transaction services a *clone* facility has been provided, which creates exact duplicates of the source object. The developer can then customize any component of the cloned object.

So far, the notion of the reusable component repository has been described. However, the presence of a repository containing customizable objects does not automatically guarantee the effectiveness of the reusability approach. It has to be complemented with tools that will allow efficient management of the components. As already stated, for such a repository to be useful it is of the essence to provide efficient navigation and searching facilities that will allow users to locate the elements they want to view or modify. Moreover, when new services are created or existing services are modified, it is very desirable to be able to *reuse* existing components implementing the needed functionality. For instance, most services have a special form or form area in which the personal details of the service user are displayed; when creating a new service, it is beneficial to re-use this form from en existing service, since development resources and time are saved, testing has already been done and uniformity across services is achieved.

Braga, Mattoso, and Werner (2001) have proposed the use of an *ontology* to aid retrieval of components that exist in distributed repositories. As defined in Noy and McGuiness (2001), an ontology is a formal explicit description of concepts in a domain of discourse (called classes or entities), properties of each concept describing various features and attributes of the concept (called slots, roles or properties), and restrictions on slots (called facets or role descriptions).

In the SmartGov approach, a simpler yet efficient navigational scheme was used based on *taxonomies*. According to WhatIs?Com Online Encyclopaedia (WhatIs, 2005), a *taxonomy* is a classification according to a predetermined system, with the resulting catalog used to provide a conceptual framework for discussion, analysis, or information retrieval. The basic difference between an ontology and a taxonomy is that an ontology defines not only the concepts (the classes) but also their properties, as well as possible restrictions on how the classes and properties can be instantiated. In a taxonomy, concepts are classified hierarchically, with each concept being a separate node in the hierarchy. Nodes appearing in the lower level of the hierarchy are known as leaf nodes. Under this scheme, an organizational taxonomy is built with broad categories at

*Figure 2. Taxonomies for navigation in the repository*




the first level, which are refined into smaller categories at the second level and so on, until the desired level of detail is reached (usually 5-7 levels) (Fraser, Adams, Macintosh, & McKay-Hubbard, 2003). Platform users that create elements can link them at any category node, either leaf or non-leaf; linkage of elements with nodes can also be modified at a later stage. Users needing to locate an element, start from the top node of the taxonomy and drill down the categories (Figure 2). Once an element is reached and displayed, the navigational facilities should allow the platform user to move to any other element linked to the current one; for example, if a field is displayed, the user should be able to view the form(s) that this field appears on, the groups it participates in, the validation checks it is involved in, examples illustrating its usage, legislation pertaining to it and so on. The information enabling the platform to display these links has been already entered by the relevant stakeholders, either as an indispensable part of the element definition (e.g., when defining a form the user selects the fields that should appear on it; the definition of a validation check references the involved fields and so forth), or as express linkage (e.g., linkage of legislation and documentation to elements). Linkage may also be implicit and derived by the context of actions (e.g., if the user selects the "Create an example" action when editing a form), the example will be linked with the form being edited.

Finally, the organization may want to define multiple taxonomies, as is the case in Figure 2. With multiple taxonomies, different classification schemes can be supported to facilitate the work of users with diverse expertise or interests. In the example of Figure 2, two taxonomies are used: the "elements by function" taxonomy is addressed to domain experts specializing on different taxation items, and the "elements by legislation" taxonomy, addressed to legal advisor. While support of different taxonomies is beneficial for users that try to

locate elements, it places an extra burden for element authors, since a link must be established for each distinct taxonomy. Semiautomatic classification schemes may alleviate this problem.

The search mechanism allows users to enter *patterns,* which are matched against the contents of the repository, and the components that qualify with respect to the matching are included in the result. The search pattern may include free text search, either in all sections of elements or in specific ones (e.g., labels, descriptions, author, keywords, content [for document-type elements only, i.e., examples, documentation and legislation] or any combination); users may also designate and the type of the desired result (e.g., *fields only*, or *examples and legislation*).

One issue that must be addressed with searching within the repository is that standard search engines examine *individual objects* whereas when searching the repository the information stated in the search pattern may be dispersed across several repository elements, perceived however by the querying user as a single entity. For instance, if the user enters a query requesting objects containing *all the words* "Name," "Surname," "Address," and "Id number," there may exist no single object containing all these words and, consequently, a standard search engine would produce no results. However, users would *expect* a field group "Personal details" to be retrieved by the query, because its elements *collectively* satisfy the search criteria. In order to tackle this issue, a modified search engine should be used for searching the repository. The modified search engine flags that an element matches a pattern if either the element itself or any of its *contained elements* matches the pattern. The "containment" relationship is defined as follows: *transactional services* contain *forms*; *forms* contain *form element groups* and/or *individual form elements*; and *form element groups* contain *form elements*. The containment relationship is also transitive, e.g. if a form element is contained in a form, it is transitively contained in any transactional service containing the specific form. Finally, validation rules, examples, and documentation are directly "contained" in any element they are linked to. Another complementary facility that can be used during searching is a dictionary of synonyms. If for example, the user searches for "Surname" and an object with description "Last Name" exists, the dictionary can help in retrieving this object.

## FUTURE TRENDS

Although the use of taxonomies can help in managing and reusing code, an ontology can offer a richer and more complete image of the organization which produces the service. To this end, know-how acquired from the SmartGov project can be used to incorporate ontologies as a mechanism for semantically managing reusable components. Furthermore, since the organization can change in time, a versioning system for the ontology can be introduced which will allow finding the elements that become obsolete as well as the history of the changes.

## CONCLUSION

It is widely recognized today that reuse reduces the costs of software development (Mili, Mili, & Mili, 1995). However, in order to efficiently implement reusability, a system is required that will enable the management of code fragments according to their logic. In the framework of the SmartGov project a knowledge based platform was implemented that allows semantic classification of transactional service elements, fast and easy copying and modification of existing code and management of the service logic by means of taxonomies. The proposed approach has been proven (SmartGov Consortium, 2004) to offer a viable and efficient solution to implementing transaction services by means of reusable components.

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## KEY TERMS

**Clone (Function):** A function which copies all aspects of an existing object including visual appearance, parameters and links to code affecting its behavior, creating thus an identical copy of the original object.

**Field:** The term field denotes the equivalent of a paper form field. Although in a paper-based form a field is usually a box that the user has to fill in, in an electronic service the same field may be implemented as text input field, selection list, radio button group, etc.

**Ontology:** An ontology is a set of concepts for a certain domain, connected together with inheritance relationships and each of them having a set of attributes.

**Pattern (Search):** A string containing alphanumeric and possibly special characters (such as wildcards) used as a target to search for. In the simplest case the string contains a word (or part of it), while in other cases it can contain multiple words or regular expressions.

**Reusability:** The extent to which a software module of an existing application can be used in other applications and/or in other contexts.

**Reusable Component Repository:** A repository that can hold reusable components. To be usable the repository is complemented with tools that allow the managing of components (i.e., the storing, categorizing, retrieval and dissemination of components).

**Software Module:** A software component that performs a well defined function and is independent of other components.

**Taxonomy:** A hierarchical classification of concepts for a certain domain. The main difference between a taxonomy and an ontology is that the taxonomy lacks the set of attributes for each concept. In a taxonomy concepts are classified hierarchically, with each concept being a separate node in the hierarchy. Nodes appearing in the lower level of the hierarchy are known as leaf nodes.

**Transaction Service Element (TSE):** *Transaction Service Element* (*TSE*) is the equivalent of paper based form field. However, in contrast to a simple field the TSE has more into it. A TSE can have a multilingual label, the field for inputting data, validation checks for checking the conformity of data to rules, instructions, documentation, or even legislation that applies on the field.

**TSE Template:** A TSE template is the equivalent to the a class definition in object oriented programming. It can be instantiated to a TSE or modified to create a new TSE template.

# Revamping the Administrative Structure and Processes in India for Online Democracy

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## INTRODUCTION

There is a talk of e-governance all over the world. India has also not remained oblivious of these developments. E-governance implies a smoother interface between government and citizen. Peoples' expectations from e-government have gone up very high. They see the new technology as a panacea to improve their living conditions. With the application of IT initiatives in certain states of India and at the union level, there has been some overall improvement in the transparency and accountability of the government. However, it must be remembered that technology cannot deliver everything. It is only a tool and an enabler to accomplish certain objectives—perhaps more quickly. E-governance has both a narrow and a broad perspective. In a narrow sense, it is focused primarily on public service delivery through Web site and Internet, while in a broader sense, it stands for all kinds of ICT (information and communication technology) applications in different stages of policy making, formulation, implementation, and evaluation (Snellen, 2005). E-governance sometimes may also make it harder, rather than easier, to achieve more information-driven, boundary-crossing reform such as improved delivery of public services (Heeks, 2002).

## THE BACKGROUND

One of the prerequisites for the success of e-governance is the issue of structural and procedural reforms in the existing system of government and administration. Such reforms must be an all-embracing endeavor, touching all aspects of government. Only then can it have any impact on the objectives sought to be attained through introducing e-governance. With the increasing complexity of human activities, growing population, consequent changes in demographic and socioeconomic structure, the forces and pressures of globalization, satellite and communication revolution, consumerist culture, and technology-savvy world, governmental functions can no longer be carried in the old traditional manner. Governments need to change themselves according to changed times on a continuing basis. However, the change process is generally slow because of the vast dispersed government structure and functions and proverbial resistance to change. The government of India is no exception, where the reform processes are further complicated, due to divergent views and policies pursued by different sets of governments (federal, state, and local), and by different political groups sharing power in different coalitional setups. With low literacy levels and strong differences of caste, community, region, religion, and ethnicity and where people are not well informed despite a well-developed press and electronic media, problems of e-governance are further aggravated by the fact that in India, opinions are much more influenced by the glamour and personality of the individual leader rather than his vision or the ideology of the political party/parties competing for political power. Thus, the result is political compromises in policies, rather than a consensual policy perspective for the general public good. Consequently, the processes of reforms also get politicized.

## ADMINISTRATIVE REFORMS AS A PRECONDITION FOR SUCCESSFUL E-GOVERNANCE

The system of administration in India has undergone a number of structural and procedural changes since its colonial days (see Jain, 1976, 2002). However, for achieving the goals of good governance at the present juncture of the Indian polity, the need of the hour seems to be to adopt a normative model of *good management approach* towards public administration. This should include (a) a more strategic or result-oriented (efficiency, effectiveness, and service quality) orientation to decision-making; (b) replacement of highly centralized organizational structures with decentralized management environment integrating with the new Panchayati Raj and municipal institutions, where decisions on resource allocation and service delivery are taken close to the point of delivery; (c) flexibility to explore alternatives to direct public provision which might provide more cost effective policy outcomes; (d) focusing attention on the matching of authority and

responsibility as a key to improving performance, including mechanism of explicit performance contracting; (e) Creating of competitive environments within and between public service organizations; (f) strengthening of strategic capacities at the center to steer government to respond to external changes and diverse interests quickly, flexibly and at least costs; (g) greater accountability and transparency through requirements to report on results and their full costs; (h) service-wide budgeting and management systems to support and encourage these changes; (i) breaking the growing nexus of bureaucrats, politicians and criminals to restore public confidence in public management system amongst the citizenry; (j) adapting of innovations and evolving suitable mechanism to eliminate corruption at both political and administrative levels and strengthen citizens' grievance redressal system; (k) downsizing of bureaucracy and improving the system of delivery at the cutting edge of administration by replacing the existing archaic bureaucratic procedures by absorbing some appropriate precepts inherent in the philosophy of new public management; (l) effectively utilizing the fruits of technical revolution and the information management system for an effective and quick public service delivery system; and (m) making improvements in the working atmosphere of the government institutions and offices to reflect a new work culture and a changed administrative behavior incorporating the principles of transparency, responsiveness, accountability, participative, and citizen-friendly management.

## E-GOVERNANCE AS A TOOL TO ADMINISTRATIVE REFORMS

E-governance is an effective tool linked to the processes of administrative reforms. It can catalyze the reform process, reduce overheads, and enhance the credibility of government agencies, which can in turn bring more investments in various sectors that can directly or indirectly help the poor by providing education, ensuring good health and creating new jobs, apart from strengthening governmental transactions. E-governance, if implemented properly, can bring in efficiency, cut delays and red-tape, and improve transparency. However, it requires a strong political vision and courage by the top leadership to ensure reforms to revamp the existing structures and processes for the implementation of e-governance and bring about the necessary transformation (see Gupta et al., 2004).

Public governance consists of multiple networks: organizational, human, and electronic, which work together to produce policies, service and knowledge. Delivery of service and making and implementation of policies is increasingly spread across various levels of government. Managing across levels of government is an increasingly important aspect of network management (Wolf, 2004).

As has been pointed out one of the basic objectives of e-governance is to make the government organizations flatter and leaner to ensure quicker decision making to respond faster to emerging situations and be productive and reliable. In many developing economies it is observed that the policies made by different sections or agencies of the government fail to gel with each other in the first go and therefore create confusions initially among the citizens. The e-governance model is likely to help achieve accountability of individuals and their post execution verification by the apex policy-making body of the government. A comparison between required attributes and the attribute of the present day processes would give the reformers an indication of what they should do to bring the necessary change (Gupta et al., 2004).

Among the prerequisites for e-governance is the requirement of achieving effective coordination in a dynamic environment, where authority, responsibility and among people are distributed. It involves a major organizational transformation. It brings changes of the types that are technology driven but which cover wider aspects of organization such as coping with new organizational structures and skills, new forms of leadership, and perhaps even a redefinition of purpose (Ibid).

A third requisite is to redefine administration's social technologies in order to remain relevant to a more participative more interactive and more informational era. A radical and effective reform becomes a necessity to prepare the government capable of adapting changes, which is not an easy task, because there are resistances at all levels. A strong leadership is needed with vision and commitment to spearhead reforms towards e-governance (Ibid).

Fourthly, in many democratic developing countries, the model of e-government will at least put a pressure on political parties to give priorities to an issue which is more important for well being of its citizens than meeting the narrow political objectives of the political parties. This is so because e-governance will make the decision-making process transparent as well as make government information accessible to the public (Ibid).

Perhaps the most important challenge for the construction of an efficient e-government is the management and funding of information technology. This includes recruitment of qualified workers, their retention and compensation. Employee empowerment and training of employees at all levels of organization is the precondition to introduce the new technologies. Insisting on the computer literacy is the need of hour at all levels of government. The most important performance criteria for computerization of administration would be levels of public

satisfaction with service delivery, improvements in productivity and efficiency and increased skill levels of government employees in handling information technology (Pardhasaradhi, 2004)

The purpose of information communication technology (ICT) is to promote good governance in three basic ways: (a) by increasing transparency, information and accountability; (b) by facilitating accurate decision-making and public participation; and (c) by enhancing the efficient delivery of public goods and services (Ibid). It is particularly helpful in establishing a two-way information communication network vertically an horizontally across the public and administrative system and helps in reinstalling and reinforcing credibility and people's faith in the government. Efficiency of e-governance can be understood from the level of empowerment he citizen enjoys in accessing and making choices about government information system and services provided regarding increased transparency and accountability in government business and dismantling of administrative hierarchical structure (Ibid).

## UNDERSTANDING THE NATURE OF E-GOVERNANCE REFORMS

While e-governance cannot entirely replace manual governance, even its limited applications are good enough to affect day to day living. It can fulfill roughly speaking, the four purposes for which citizens generally interact with the government; (1) paying bills, taxes, user fees and so on; (2) registration formalities, whether of a child's birth or a house purchase or a driving license (i.e., in the state of Tamil Nadu in India, one can download 72 application forms); (3) seeking information; and (4) lodging complaints. E-governance can reduce distances to nothing, linking remote villages to government offices in the cities, can reduce staff, cut costs, check leaks in the governing system, and can make the citizen-government interaction smooth, without queues and the tyranny of clerks. It is only through electronic governance that transparency and accountability can be obtained in government procedures and can lead to quick delivery of services to the citizens. With these goals in mind, a number of e-governance programs have in recent times been implemented at the states and union levels in India, some of which are discussed in the following paragraphs. There are also proposals for the ICT to be used in a strong way to provide planning tools to the local bodies.

For example, the *Gyandoot* program of the government in the state of Madhya Pradesh provides to the people a number of services to the people at a nominal price. The services include: online registration facility, copies of land records, and agriculture produce auction center rates. Karnataka, another state of India, has applied IT in the areas of (1) education, wherein transparent common entrance test, recruitment, transfers, and payment of salary of teachers is computerized; (2) development and use of the support system to keep a track of the chief ,minister's (CM's) decisions, instructions, the constituency management system, and summarized data on major projects in health, housing, and other social sector schemes. Other e-governance-related programs are *Bhoomi* (land records project in rural areas in states of Karnataka and Maharashra at 189 locations), CARD in the state of Andhra Pradesh at 230 locations provides for payment of property taxes and issue of land titles), *Nondini* (computerized registration operational in 12 sub-registration offices in Banglore), Secretariat Local Area Network, *Khazane* (account of all the payments of the state), E-lottery and Yuva.com, and so forth. The state of Kerala has launched an e-governance project known as FRIENDS (fast, reliable, instant, and efficient network for disbursement of services) for availing a long range of public services like payment of taxes and utility charges, renewal of licenses and to obtain the latest information on government programs. The state of Andhra Pradesh is also implementing e-governance through a project known as SMART (simple, moral, accountable, responsive, transparent). The central government has also introduced a computerized system of administration in a limited way in the departments of railways, planning commission, human resource development, and rural development ministries, University Grants Commission, passport departments, and so forth (Jain, 2005; Bhatnagar, 2004). Despite these well intentioned initiatives taken by the center and the states, the system would not yield desired results unless the prerequisite of revamping of administrative structures facilitating these programs are established and education and training infrastructure are developed to enable people to derive the maximum benefits out of these efforts.

But it must be remembered that e-governance is only a tool for good governance. It cannot be effectively implemented without the appropriate structural and procedural innovations designed to assimilate it. It cannot succeed independent of responsive officers, and it has to be owned by the political leadership. Otherwise it will only be a bureaucrat's game (*India Today,* 2000). How to rebuild the system of governance on these new premises without the majority of population even being literate is a real challenge for all concerned with adopting new innovations in the performance of the government (Jain, 2002).

It is ironical that despite India having the highest degree of IT development amongst the developing countries, it has the poorest of its application in governance.

One of the main reasons for this phenomenon is that Indian population is digitally divided. One part of citizens is highly aware and educated, and technologically competent to understand and utilize the digital technology, while the other section, comprising of a majority of citizens is illiterate and technologically ignorant. There is a need to bridge this gulf and create a digitally literate population. Experiments have been made in some states of India to bridge this gap through the setting up of electronic kiosks in rural and other remote areas with the cooperation of the private sector to provide services to citizens at nominal costs. This program, known as *Drishtee*, (literal meaning vision—Kiosk-based e-government for rural India) has been extended recently to five Indian states, brings e-government services to rural India using kiosks run and maintained by entrepreneurs who charge a small fee for access. *Drishtee* combines social activism with market solutions in order to alleviate the problems of poverty and weak government and help those isolated by distance and lack of resources (International Institute for Infrastructure and Development).

This concepts needs to be further developed and implemented vigorously, which hopefully will make the fruits of e-governance not only being utilized by a majority of the vast illiterate population, but also make it self-sustaining. The government of Andhra Pradesh is now embarking on a project to develop 22,000 such kiosks throughout the state.

## FACTORS AFFECTING E-GOVERNANCE REFORMS

For affecting e-governance reforms, two important elements deserve specific mention: people and technology. Since the initiative for e-governance has to come from government itself, government needs to be proactive. E-governance also means that people have access to computers and also must be proficient in operating them. Thus, reforms, aimed at implementing e-governance in a country, are worthwhile and have a great chance of success only if people are comfortable with new age machines. Also, security of data is a major concern, as e-governance involves exchange of valuable information over the network. Hence, a legal framework to deal with any breach of that security and security measures for the data has to be in place for any e-governance initiative to be successful (Gupta, et al. 2004).

Another bottleneck in the way of e-governance is the perennial problem of resistance to change from the bureaucracy and the lack of political will on the part of the leadership. These have been critical factors in the failure of many reform efforts in the past and also in the various e-governance initiatives. These factors have led to a lack of long-term commitment and funds needed for changeover to e-governance. At the same time it, is important that there is a change in the attitudes of the employees responsible for operating the e-governance mechanism. The traditional attitude of the governors toward the governed will not help promote the concept of e-governance, nor will it secure help and cooperation from the private sector. The need for changing the mindset and psyche of the civil services is of prime importance if the fruits of the use of IT in governance are to be fully utilized through the cooperation of the private sector.

Finally, publicity campaigns through electronic and print media in local languages, which could give all information and explain in simple terms the likely accruable benefits through such initiatives, are highlighted and publicized and are of utmost importance. The publicity campaign should be carried out in the common language of day-to-day conversation and should also provide information about the location and at what costs such services are available. Political and bureaucratic leadership need to mobilize to provide what can be called technologically-enabled governance, for which it is necessary to sensitize the realm of peoples' awareness through forums of interaction, education, and networking.

## FUTURE TRENDS

It is a well-known fact that India suffers from an absence of governance, and most people in India do not have any access to government or political authorities. The question is how much of e-governance could enable good governance and bring the government nearer to the people. A popular joke that prevails around India is that e-governance means only election governance, as all political parties plead for their introductions during elections, but does little by way of implementation after elections. Notwithstanding the political and bureaucratic apathy to its expansion in critical aspects of the functioning of government and aversion to private sector participation in these areas, there is a big scope of public-private partnership in India for providing services to citizens deep down to the rural level. One has to learn lessons from different countries in this respect. But for this, it is necessary to have changes in the infrastructure of the administrative system and in the attitude of the civil services. This can be done if the concept of the CEO is borrowed from private sector and if its autonomy of functioning with same emoluments and perks is adopted in the civil services. Qualified and expert specialist personnel from the private sector could also be seconded to

the civil services. Poor infrastructure in public administration has further hindered the process of decision making in implementation of projects through e-governance. If properly developed and implemented, governments both at the union and state levels in India and can very fruitfully adopt the techniques of e-governance in three key areas, where substantial reforms are urgently needed: (a) development of a police network throughout India; (b) reforms in the judiciary and legal systems to reduce delays in the finalization of billions of civil and criminal cases pending for judgments in the courts throughout India; and (c) delivery of essential services to citizens at all levels.

## CONCLUSION

In the background of India's experiences to bring in an era of e-governance, this article attempts to reiterate that e-governance is something more than moving government services online. It is to make government more interactive and participative with the public. While the rising expectations of the public and the compulsions of the government to improve its service delivery system and removing public grievances are some of the important factors behind the reforms for e-governance, the primary issues that the e-governance reformers need to consider carefully are those of structure and processes of administrative reforms, literacy and technical training in handling equipment, data security, maintenance of the system to prevent failures, continuous updating, attention towards authenticity of data collected, analyzed and used, and adaptability to new technology. E-governance furnishes a great instrument and an opportunity to bring efficiency, economy, effectiveness, and equity in the government operations along with accountability and transparency. Despite the fact that India has embarked upon a series of reform measures in its public administration system, mostly in its methods and procedures. (For a detailed study of these reform measures see Jain, 1976, 2002). E-governance has received attention only recently (Oracle, n.d.). The introduction of e-governance poses a formidable challenge in a pluralist democracy like India, which despite being technically very well developed in comparison with other transitional societies, has a great illiterate and semiliterate population with limited means for technical equipments. Hopefully, a discussion of India's efforts and experiences toward e-governance, its successes and failures, (for details see Kumar, 2004), and the kind of reforms and innovations needed in its administrative structures and processes as a prerequisite to its installation, would be of some interest to other transitional and developing societies, embarking on a path of e-governance.

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## KEY TERMS

**Administrative Reforms:** A process through which governments affect changes in their administrative structures, personnel, or processes for better efficiency and performance. These can be undertaken by the concerned officer to meet minor problems or bottlenecks in administration arising on a day-to-day basis or after the recommendations of a study group, expert committee, or a high-powered reforms commission, suggesting comprehensive and far-reaching changes in the administrative system after a detailed study and deliberations.

**E-Governance:** Defined as the process of enabling transactions between concerned groups and the government through multiple channels by linking all transaction points, decision points, enforcing/implementation points, and repositories of data using information and communication technologies (ICTs) to improve the efficiency, transparency, and effectiveness of a government.

**E-Government:** A process of reform in the way the government works, shares information, and delivers services to external and internal clients through harnessing external and internal clients.

**Governance:** Defined as the manner in which power is exercised in the management of a country's economic and social resources for development.

# The Role of E-Government in Rebuilding Bosnia-Herzegovina

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## INTRODUCTION

The world is currently experiencing a period of major change. The emerging new world is variously referred to as the third wave, the information age, the information society, or the knowledge-based economy. Regardless of the terminology used, what matters is that the new social, political, and economic world is globalized, based on the production, distribution, and use of knowledge, and is heavily reliant on information and communication technology (Handzic, 2004a). It is also characterized by increased complexity, uncertainty, and surprises. Some analysts like Raich (2000) think of it as a period of living in the centre of the "Bermuda Triangle" where individuals, organizations, and societies have to deal with the increasing turbulence and speed of change in order to progress.

The rise of the information society has brought major changes in citizen and business expectations, as well as organizational structures, cultures, and work processes. To remain responsive to the changing needs of their constituents, governments increasingly have to adopt information society tools and working practices. Essentially, they have to use information and communication technology (ICT) as tools in private and public sector renewal, develop information industry, maintain high level of professional expertise in ICT, provide opportunities to use information society services and have information infrastructure capable of providing such services. The purpose of this article is to explore how these processes are helping in rebuilding Bosnia-Herzegovina.

## BACKGROUND

As any other country, Bosnia-Herzegovina (BiH) cannot stay out of the way and isolated from current world trends. Its transformation into a modern knowledge-based economy and information society is viewed by BiH government as the key for its prosperity or even survival in the global competitive environment. There is also a recognition that only as an information society can the country decrease the existing divide between different social groups and individuals, and ensure progress and a future for all its citizens. Finally, there is a recognition that, in order to catch up with more advanced countries, the transition of BiH from an industrial to an information society will require proactive and accelerated application of information and communication technologies (Policy of Information Society Development in Bosnia and Herzegovina, 2004).

In addition, BiH transformation to a modern information society is seen as a strong means of rebuilding the confidence and regional collaboration destroyed by the 1992-1995 war. More importantly, the development of an economy and governance based on the application of information and communication technology is identified as the only plausible path that will enable BiH to take a worthy place within a united Europe (Policy of Information Society Development in Bosnia and Herzegovina, 2004). Finally, there is a widespread agreement among the international and local community that the transformative processes should not happen haphazardly, but rather by using experiences from other countries to direct and develop these processes (Strategy of Information Society Development in Bosnia and Herzegovina, 2004). Of particular importance is harmonization with European processes (Handzic, 2004b).

The transformation of public administration in the direction of e-government is one of the key segments of the overall process of building an Information Society in BiH. It is also a crucial pre-requisite for the integration of BiH into the European Union. Therefore, it is important to understand what courses of action, development factors and activities are being undertaken related to the reconstruction of public administration, and how successful they have been so far.

## INVOLVEMENT OF THE INTERNATIONAL COMMUNITY IN THE E-GOVERNMENT STRATEGY DEVELOPMENT

The EU defines e-government as the use of information and communication technologies (ICT) combined with organizational change and new skills in order to improve

public services and democratic processes and strengthen support to public policies (http://europa.eu.int). In the broadest sense, the expected impact of e-government is simply better government. More specifically, e-government promises better policy outcomes, higher quality services and greater engagement with citizens and private sector. Typically, e-government initiatives focus attention on effective collaboration among institutions, enhancing customer focus and building relationships with business partners. However, e-government benefits to the quality of life, industrial competitiveness, and society can only be realized if administrations change the way they operate.

E-government has only recently received systematic attention, and is now becoming a positive factor in the long-term development of BiH. Several factors have been identified that contribute to the stronger attention given to e-government issues in the post-war rehabilitation and development of BiH (eSEEurope, 2004). One is an understanding of the beneficial role ICT could play in the interaction between government, citizens and business. The other is active involvement of a number of international bodies in creating standards, models, and best practices. Most notable among these are the United Nations Development Programme (UNDP) and the European Union (EU).

E-government development effort in BiH is based on a number of important initiatives. These include the 1995 G7 government online initiative, the Feira 2000 eEurope Action Plan, eEurope+ plan for informatisation of EU candidate countries, the global initiative for the Information Society under the auspices of the United Nations, the eSEEurope Agenda for the Development of the Information Society adopted by the Southern European countries, and the Poverty Reduction Strategy Paper (PRSP). These initiatives have raised awareness and paved the way for the start of the BiH national Information Society Development. The following are some major steps undertaken in this process presented in chronological order.

First, the ICT Forum was started with support from UNDP to develop situation assessments and preliminary recommendations in a number of areas relevant to the use of ICT in development. It was divided into seven round tables that covered the most important aspects of ICT usage and development. The Forum and its round tables gathered more than 100 local experts from various fields, as well as hundreds of participants of public discussion in entire BiH. Based on their conclusions and recommendations the ICT Forum issued a variety of reports in late May 2003, including: (1) Millennium Development Goals and The Information Society; (2) Infrastructure for an Information Society, (3) Policies for an Information Society; and (i4) Information and Communication Technology for an Information Society–Final Recommendations and Conclusions. These documents provided a basis from which the BiH national Information Society Development proceeded in fast and effective manner

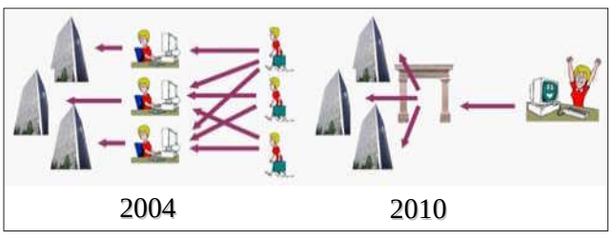
As the next step, the Government of Bosnia and Herzegovina and the UNDP entered into a Memorandum of Understanding (MOU) on Information Society Development. The parties undertook to formulate a joint Project Document that outlined the process, expected key results, and a time-frame relating to the development of the Information Society. This MOU formed the basis on which UNDP was supporting the development of a comprehensive policy for an Information Society in BiH, a process taking place at the expert level and with public participation but under the overall guidance of the Council of Ministers. The idea initiated on the international level was diffused by media to ensure the widest possible visibility, support, and continuity of the process.

The actual development of a BiH national information society (IS) strategy started in October 2003. An expert group consisting of both government and non-government members produced the document "Policy for Development of Information Society in Bosnia and Herzegovina." That document serves as a framework in accordance with which future legislation, acts, and other regulations will be passed in the process of building and development of an information society. It also serves as a baseline upon which future decisions will be taken on development directions, action plans, and priorities at the level of Bosnia and Herzegovina and its entities.

Starting from the Policy document, larger expert groups developed the documents "Strategy for Development of Information Society in Bosnia and Herzegovina" and "Action Plan for Development of Information Society in Bosnia and Herzegovina." Both documents cover five key development pillars identified by the Policy document (e-education, e-governance, ICT Industry, ICT Infrastructure, and e-Legislation). The Strategy document includes a short review of current sector status, defines the vision for the period 2010-2015, and provides a set of strategic recommendations for achieving the envisioned status. According to the strategy document, the action plan defines a set of concrete actions (initiatives, large development programs, projects, pilot projects, etc.) that should be implemented during the period 2005-2010, in order to achieve the goals defined by the strategy paper.

By the end of 2004, all three papers were officially accepted by the BiH Council of Ministers, as well as the representatives of the international community. Before that, the documents passed extensive public and expert debates and consultations. The second conference on Information Society gathered over 400 participants including government officials, local and international ex-

*Figure1. E-government in BiH Present*




perts, as well as leading industry companies. Based on participants' suggestions, expert panels produced technical and very specific suggestions on both the strategic and the operational aspects of IS development. Through this approach, policy and strategy development was more inclusive and participatory.

In sum, European and other initiatives provide a global framework for e-government development in BiH. Late adoption and transfer of best international know-how helps the country to learn from others, and thus avoid repeating the same mistakes. In addition, experiences of others under similar circumstances show that the participatory consultative process followed ensures a quality and realistically feasible strategy. However, the lack of coordination among many different players and agendas, coupled with the complex state structure and public administration organization of BiH, seriously hinder the e-government implementation success, as shown in the next section.

## CURRENT E-GOVERNMENT IMPLEMENTATION STATUS AND FUTURE ACTION PLAN

The e-government strategy of BiH envisages that the country's transformed public administration will provide its citizens, business partners and non-governmental organizations with improved quality, availability and efficiency of services; increased operational effectiveness and knowledge sharing among institutions; improved dialogue with citizens and their greater involvement in the democratic process; and improved government transparency (Radivojevic, 2004). It will also create pre-requisites for integration of BiH into the European Union by 2010.

However, several major obstacles exist in introducing the concepts of e-government in BiH. Current legislative and judicial systems are not well equipped to take up the challenge of e-governance. At present, there are 146 municipalities in BiH, 10 cantons, two entities (Federation of Bosnia and Herzegovina—FBiH and Republika Srpska—RS), District Brcko and state level government. Such a complex structure produces various problems in terms of e-governance. For example, there are 13 parliaments with power to define laws (sometimes contradictory to each other); principles and practice of governance in one municipality (or canton) are often very different than in another; there is low tendency towards making common databases or towards connecting the databases; there is almost no electronic communication, horizontally or vertically; there are no accepted standards relating to software and hardware systems; there is no state level plan for informatization of state administration; existing electronic governance support systems are not well connected and cannot give the reliable and timely information to citizens. In short, the eSEEurope (2004) report claims that there is no implemented e-governance concept in BiH at all, while the System Review of Public Administration Institutions in BiH (2004) interim report identifies only isolated cases of e-government.

Other obstacles include lack of equipment and financial support, and the profile and number of employees in administration (one employee per 350 citizens as opposed to 2000 in developed countries). This is a serious problem in all structures in the country. However, one can speculate that the blame for the huge gap between the capacity to design the top level Information Society development strategy and incapacity to implement it does not lie solely in weaknesses of Bosnian institutions. The current situation is also one of the consequences of the 1992-1995 war, as well as of the post-war arrangements set by the Dayton peace agreement. In such an environment, it is hard to implement new systems that are efficient and concentrated on citizens. A concerted effort of both the international and local community will be required to address these issues.

According to Wimmer (2001) an effective e-government may be possible only if the country has adequate public administration legal regulations, modern and safe ICT implementation and people skilled in ICT use. Deficiencies in these areas found in BiH are not unique but rather a common malaise of all transitional societies. However, because BiH is a protectorate rather than an independently governed state, the international community should bear at least some responsibility for failing to provide adequate means of bringing their decisions to execution faster.

The general review of ICT use in public administration (System Review of Public Administration Institutions in BiH, 2004) indicates low digital literacy of employees, low internet access and no official access points. With respect to digital literacy, only about half of the employees can use personal computers, BiH administration does not recognize ICT workplaces, and institutions

do not employ adequate specialists. Furthermore, those working on information systems development, implementations and maintenance are not well trained. This situation is expected to change soon as a result of the establishment of the world class international university in BiH namely Sarajevo School of Science and Technology (SSST). In partnership with the University of Buckingham from UK, SSST (http://www.ssst.edu.ba) provides specialist degrees in Computer Science and Information Systems that will produce the workforce suited to the Information Society.

With respect to internet access, the World Bank World Development indicators (http://www-wds.worlsbank.org) reveal that 61% of governance institutions do have access to the internet, but only 4% are connected by cable connection; institutions are using the services of almost 40 different ISPs; government Web pages have no real and up-to-date information useful to citizens; there are no official places where citizens can find accurate and secure information on the local economy, state administration, history and so forth; public institutions do not use the electronic media to transparently inform citizens of annual investment plans, procurement, budgets, etc.

Nevertheless, there are some notable initiatives and projects related to e-Governance development. Two projects of strategic importance have been recently implemented: CIPS—Citizen Identification Protection System (2003) and Treasury information management system (Deloitte Touche Tohmatsu, 2004; Runko, 2002). Other important implemented projects include customs administration, elementary municipal systems, Web portals offering at least basic information to citizens, introduction of electronic databases etc.

## FUTURE TRENDS

The majority of implemented projects are consistent with the realisation of the first phase of the e-government action plan focusing mainly on information management and the formation of basic registers. Such electronic records enable a fairer and wiser society by providing evidence, protecting individual rights and preserving social capital (Handzic, 2004a). The next three phases of the plan emphasize aspects of interaction, integration and transformation aimed at making these electronic records more visible and usable to citizens and business partners as illustrated in Figure1.

Another visible symbol of BiH government commitment to new approaches to development will be the creation of a specific Agency for Information Society (AIS). The main goal of AIS will be to provide a government-led stimulus to change and speed up its transformation in partnership with OHR, UNDP and CoM. In particular, the Agency will have to ensure the effective connection between two previously largely unconnected areas of information and communication technologies as a major information society development tool. It will also have to provide a coherent framework to a number of currently uncoordinated international, private and public e-initiatives and e-policies. In short, the Agency will be main coordinating agent in BiH Information Society (and thus e-government) strategy implementation.

## CONCLUSION

The main objective of this article was to explore the place of e-government in transforming a society through a case study of Bosnia-Herzegovina (BiH). The article starts by introducing the global, regional, and local context in which the development of e-government is taking place. The analysis indicates that it is characterized by a unique and complex public governance structure of BiH and high involvement and influence of the international and European community.

The article identifies two important aspects of e-government development process in BiH: (1) global framework for the transition into an information society (including the transformation of the public sector towards e-government) and (2) harmonization with the European process. Together, they should enable the change of culture and institutions to take place in a controlled manner and thus facilitate the creation of conditions conducive to innovation and value creation. They should also provide BiH with a rare opportunity of applying best international practice to avoid costly mistakes.

At the same time, the article warns that the present complexities of the local context seriously hinder the e-government implementation effort. The general observation is that there is a lack of appropriate legislation and coordination to guide the process, as well as a lack of adequate technology and human resources. Yet, an effective e-government may be possible only if it has adequate public administration legal regulations, modern and safe ICT implementation and customers skilled in ICT use. The good news is that there exist some isolated examples of e-government at work (e.g., CIPS and Treasury systems) and a realistic action plan. This incremental implementation plan is expected to result in a fully transformed (i.e., electronic, interactive and integrated) government usable by citizens and business partners by 2010. Overall, it appears that BiH is placed firmly on the path towards e-government, with a slow beginning, but a promising future.

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## KEY TERMS

**E-Governance:** Evolutionary process of re-engineering of business processes and reform of the work of administration/government that goes beyond the introduction of information and communication technologies.

**E-Government Action Plan:** According to the strategy document, the action plan defines a set of concrete actions (initiatives, large development programs, projects, pilot projects, etc.) that should be implemented during the set period of time, in order to achieve the goals defined by the Strategy paper.

**E-Government Policy:** A basic document in accordance with which the future legislation, acts and regulations are passed in the process of building and development of e-government, and upon which future decisions are taken on development directions, action plans and priorities.

**E-Government Strategy:** A document that explores the current situation, defines the vision for the future, and provides a set of strategic recommendations for achieving the envisioned status.

**E-Government:** The use of all information and communication technologies to facilitate the daily administration of government; Internet-driven activity that improves citizen access to government information, services and expertise to ensure citizen participation in, and satisfaction with the governing process.

**Information Society:** A society in which the economy and governance are based on know-how, and heavily reliant on information and communication technologies.

**Knowledge Economy:** An economy in which the main source of wealth and growth is knowledge.

# The Role of E–Parliament in Hungary

R

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## INTRODUCTION

The supreme legislative power of the Republic of Hungary is the unicameral National Assembly, which has 386 members.

The 1990 political changeover expedited the development of democratic institutions and substantially increased their importance. Besides the traditional media, electronic information has assumed an increasingly important role (European Commission, 1999).

The change of paradigm in the management of information is made necessary by the recognition that knowledge supports politics. Parliamentary work is one of the main sources of this. Thus, Parliament and its standing committees function as systems acquiring and processing information. These systems have so far tried to produce information from largely unstructured data in the course of written and verbal communication.

According to the new paradigm systematisation of the knowledge of the organisation and the environment will generate the knowledge base which will be suitable for upgrading the quality of political and professional processes (Hungarian Government, 2003).

The work in Parliament, the utterances of politicians are in the forefront of public attention. Therefore the staff of the Office of the National Assembly should provide access to current and accurate information on a continuous basis. In the information age this is a serious challenge for Parliament. This is why it has become necessary to determine the demands that electronic Parliament (e-Parliament) has to meet, and to devise ways for their gradual and systematic satisfaction.

## BACKGROUND

This case study is aimed at describing the concept of e-Parliament in Hungary, its implementation, achievements and future plans. The following topics are addressed:

- The political and legal background of the development of e-Parliament
- The development of the information technology background of e-Parliament in Hungary
- Social dimensions and relations of e-Parliament

## THE POLITICAL AND LEGAL BACKGROUND OF THE DEVELOPMENT OF E-PARLIAMENT

At the end of 1999 the European Commission published the first eEurope Action Plan followed by eEurope 2002 and eEurope 2005.

On January 1, 2001 the Hungarian Parliament established the Informatics and Telecommunications Committee, a standing committee which has proved to be very useful in shaping the legal environment for an information society since its inception.

In 2001 Parliament subscribed to the goals specified in Chapter 3 of E-Government, the Electronic Government programme under the eEurope initiative, and became a part of the tasks outlined in the Action Plan.

Following its integration into the European Union on May 1, 2004 Hungary must realise the goals of the eEurope Action Plan approved by the Member States. The Action Plan aims to develop modern online public services (e-government) as well as a dynamic environment for e-business in all EU Member States by 2005.

This can be achieved through widespread availability of broadband access at competitive prices and a secure information infrastructure. To this end, Hungary launched the Public Network Programme in 2004, which makes broadband access available to all of the public institutions.

Launched in November 2004, the Internet Based Administrative Services system (XR) was a major step forward on the path to electronic public administration (Hungarian Act CXL of 2004).

The launching of e-government services was facilitated by the E-Government 2005 Strategy and Action Plan, which was drafted and put to social debate by the Centre for Electronic Government of the Prime Minister's Office at the end of September 2004 as part of the Information Society Strategy of Hungary.

The Centre for Electronic Government operates the Hungarian government portal at www.magyarorszag.hu, which serves as a point of entry to government services and offers interaction in certain matters. In addition, the portal presents news and information about the Government and the country, and provides the largest Hungarian database on the European Union (Hungarian Government Decree No. 44/2005 & 193/2005).

The Dialogue Forum is a particularly important feature of the portal. Unlike other online forums, it only accepts real names to log on. The operators expect people will formulate their opinion in a more deliberate fashion if they have to give their name.

The Ministry of Informatics and Communications and the Inter-ministerial Coordination Committee for Information Society envision submitting to the government the Hungarian Information Society Strategy before the end of 2004. Upon the request of the Ministry of Informatics the ministries and organisations concerned have prepared their respective sub-strategies, which contain, among others, programmes regarding the electronic signature and the smart card.

At its session on July 4, 2005 the Hungarian National Assembly passed Act XC of 2005 on the Freedom of Electronic Information with effect of January 1, 2006 except for some of the provisions, which will enter into force as of July 1, 2007. Implementation at the level of the Office will be ensured by the internal Rules and Regulations developed in 2005, which provides for the rules of disclosure of data of public interest, and of the provision of electronic information. Some of the contents of the Rules require expansion of the e-Parliament project.

## THE DEVELOPMENT OF THE ICT BACKGROUND OF E-PARLIAMENT IN HUNGARY

Today, processes supporting the work of Parliament are inconceivable without ICT support.

The Hungarian Parliament deployed its first major ICT investment between 1990 and 1992 with the involvement of American and EU (PHARE) funds. Currently the Office of the National Assembly operates nearly 1500 PC and laptop workstations and is equipped with reliable and up-to-date network and servers.

Based on the Oracle database management system, the Information System of Parliament (PAIR, by its Hungarian acronym) and the system in the assembly rooms have become an integral part of Parliament's everyday work and processes. Events related to the work in Parliament, documents and drafts are keyed in as part of the office routine and are made available for queries.

Even the early stage of development of Parliament's IT system included electronic information provided to citizens as a fundamental goal. The domain name of the Office of the National Assembly was registered by the Internet service provider on June 22, 1994. As a result Parliament has operated its own Web site on a continuous basis since 1995. The content has gradually been expanded as a result of upgrading of the IT system of Parliament.

The information system relying originally on static Web pages was replaced by dynamic data base query in 1998. This ensures that citizens can continuously monitor the functioning of Parliament, the events in plenary sessions including the votes and the committee meetings as well.

Further milestones in upgraded Internet services included regular live Internet broadcast of the plenary sessions from the beginning of the 2002 term as well as the option to search and play digitalised video recordings of speeches delivered in plenary sessions.

Annual review of the ICT strategy and full-fledged consolidation and upgrading of the medium term plan for 2005-2007 was concluded in December 2004. The plan allows for further expansion of the e-Parliament project by adding new tasks, which are handled by means of widely accepted modern IT solutions.

## SOCIAL DIMENSION AND RELATIONS OF E-PARLIAMENT

The role of e-Parliament should be explored in the context of the social dimensions and relations of the electronic Parliament, which has been developed in an integrated system. Based on the functions and operation of Parliament, the social dimensions and connections can be classified as follows:

- Parliament's relations with citizens and civil organisations
- The system supporting MPs' work
- Parliament's internal processes and the system supporting decision making
- Relations with other branches of power and to administrative and social agencies
- Relations with foreign Parliaments

### Parliament's Relations with Citizens and Civil Organisations

The relationship between Parliament and citizens is instrumental in terms of the exercise of democratic rights. Accordingly, the Office of the National Assembly gives a high priority to this issue. In this effort, in addition to traditional solutions, it makes use of electronic devices which meet the expectations of an information society.

A home page with an up-to-date content is a key tool of electronic information. It offers citizens and civil society organisations a clear picture of the structure and functioning of the National Assembly, its role within the legal order and society as well as of its fundamental task of legislation and related events. In Hungary citizens and

civil organisations show a keen interest in the information offered on the Web site of Parliament, a fact proven by statistics of Web site hits (Enyedi & Tamási, 2001.).

The Hungarian and English content of the Web site www.parlament.hu differ as bills, proposed amendments and other documents including the minutes of plenary sessions are only available in Hungarian.

Besides queries related to data parliamentary work in the stricter sense, the expert system and data base of the National Assembly, the Web site also provides information in the public domain in the following areas:

- The structure and functioning of Parliament; information on the legislative process;
- Information on the legislative plan of the National Assembly (bills, submitted, schedule of deliberations, and expected enactment);
- Additional information related to Parliament (for instance calls for projects from the civil sector);
- Electronic access to all the services of the Information Centre of the National Assembly.

The introduction of a video server brought a major enhancement in the quality of electronic information from the change of government in 2002. The system provides live broadcast of plenary sessions via the Internet, and stores the digitalised speeches delivered in plenary, which can be searched according to different parameters and replayed at any point in the future.

Although Parliament does not deal with citizens' affairs, nor are bilateral transactions typical, the possibilities for online interactive electronic contacts should be explored along with demands and requirements regarding such services. Our surveys show that civil organisations are mainly interested in information provision, simple communication and queries (Pethõ, B. 2002).

## The System Supporting MPs' Work

The Office promotes the work of MPs and experts by providing appropriate ICT infrastructure on the one hand, and by applications available via uniform and standardised user interface (intranet, Internet, e-mail, CD-server, etc.) on the other hand.

The Office installed an electronic mail system in January 1995 available for MPs and office staff. The MPs' e-mail addresses are public which allows citizens to get in touch with their representatives.

In the first stage of e-Parliament formulated in 2001, MP's had to be provided with the possibility of distance work. The major upgrading that took place parallel with the 2002 change of government as a result of preliminary developments enabled MPs to join the work processes of Parliament from their home or external office, or to be able to work from their home (Molnár, L. 2002).

The security of distance work is guaranteed by an intelligent smart card, which is suitable for storing *X.509* digital certificates. It supports safe login through MS Windows, authenticates and encrypts correspondence, and will append electronic signature to certified documents to be introduced in future (PKI compatibility). In the event of loss or theft of the card the laptop cannot be used by an unauthorised person.

Four hundred laptops have been purchased in order to support distance work. This went hand in hand with creating the conditions for efficient distance work including individual broadband access for all MPs.

A basic requirement of distance work relying on laptops was that laptops could be used in an office environment, in sessions, and on other premises to suit the choice of the user. Essentially, laptops should be able to function as mobile offices supporting secure distance work. Thus a data transfer system had to be devised which ensures MPs secure connection to the internal information system of the National Assembly.

Formerly, materials required for the preparation of decisions in plenary sessions or in the committees were delivered by courier. This was an extremely costly service and had the added drawback that MPs often received documents outside their scope of interest and sometimes ended up having to plough their way through mountains of papers virtually impossible to process. The e-Parliament project had to remedy this situation. For this reason, the most important task of Stage II of e-Parliament was to replace the physical courier service with the electronic e-courier.

As a first step to determine the specifications of e-courier, the earlier courier delivery practice was surveyed and analysed. This was followed by defining the content of the electronic courier service together with the most appropriate technological solution. The trial run of the electronic courier started in September 2003. Presidential Decree No. 2/2004 on the definitive introduction of the electronic courier entered into effect as of September 1, 2004.

Pursuant to the provisions of the Presidential Decree, the electronic courier service must be activated from the main menu of Parliament's Web site (www.Parlament.hu). This greatly facilitates the use of e-courier: all the MP needs to do is to connect onto the Internet without having to log in on the internal network via VPN. At the same time this also means that e-courier is public domain, the only exception being committee documents for deliberation or information, which the submitter intends to send exclusively to committee members. Such documents are supplied to MPs by either e-mail or traditional delivery.

The e-courier is a prime paper-saving tool for supplying, and providing access to, and information on, documents needed for the MPs in their legislative work, lists of their submission, as well as other documents and materials of an informative nature.

Making materials required for legislative work available to MPs electronically via the Internet has resulted in the revamping of working methods and procedures, which not only brought a significant positive change in the life of Parliament but also opened new vistas of public information as citizens can access the documents deliberated in Parliament in the same structure and with the same content as MPs (European Commission, 2005-2006).

## Parliament's Internal Processes and the System Supporting Decision Making

Once e-Parliament has been fully implemented, information will be generated electronically in parliamentary work processes; they will be stored in an Oracle database, and all information-related activities will be preceded by planning, and will be carried out by continuous updating of events.

In addition, e-Parliament must provide electronic connection between MPs, parliamentary groups, committees, officers and secretariats as well as electronic inter-committee connection.

Office tasks related to legislation (deadlines, consultations and other administrative duties) as well as IT support of work processes require further development.

The organisation and conduction of plenary sessions, the work of chairpersons and registrars are supported by modern installations in the assembly rooms (amplifiers, electronic voting system, etc.). This system also ensures connection between the Video studio and the Parliament's ITC system.

Internal communication is supported by the online electronic telephone book of Parliament. This system is at the same time a central organisational and personnel database, which provides consistent data for the central data directory and all related applications, handles user authorisations as well as help desk support for users, and provides data for the government data directory as a one-stop shop.

The goals of e-Parliament include the creation of a paperless office. Based on international experience, this has not yet been achieved anywhere. It is, however, indispensable that each work process can be carried out without a paper base. Identifying materials that are unnecessary for certain MPs, and discontinuing their printing was a realistic objective. In addition, the handling of documents, which need to be read while session is in progress, will be made easier.

In order to meet the goals it was first necessary to define the scope of new documents, or those prepared earlier by a word processor, which should be digitalised, then put on records, with the original signatures as certified true copies.

A special technology was developed to ensure digitalisation, storage and search ability of documents. It files all documents submitted (input of metadata in the database). This is followed by digitalisation; then the documents automatically become accessible and can be queried from the Web host server.

Introduction of the electronic signature will bring a dramatic change in electronic document management. The legal framework has already been provided for in the Act on Electronic Signature.

The first real-life application of the electronic signature was in conjunction with the statement of property submitted by the MPs in 2005. This task is undertaken by means of XML tools. The project includes XML technology as well as electronically signed document management.

An important development project for 2005 and 2006 is the uniform structure for handling Web contents accessible via the intranet, extranet and Internet through a portal system. The portal under development will coordinate all the interfaces and applications that have been developed so far. Distance work, documents with various levels of authorisation and different applications will be handled in a transparent format from a unified platform, and can be tailored to suit the individual user.

## Relations with Other Branches of Power and to Administrative and Social Agencies

In the course of preparation of legislation and policy debates, there are intensive connections between government agencies and non-governmental organisations on the one hand, and different structural units of Parliament, specifically the standing committees on the other hand (West, 2005.).

A key element is the development of digital relations with government institutions, parliamentary secretariats, the State Audit Office and other agencies, organisations and branches of power related to the National Assembly. These relations are supported, besides an intranet and the Internet, by an extranet system, which has been in operation since 2000. It provides a private Web-based service to designated users of the government's network. In 2005 substantial development efforts were targeted to this area as a result of which we reached almost 100% paperless

document handling due to the upgrading of the data content of the extranet and enhancement of its operation.

A major step forward has been taken in the e-Parliament project in the electronic management of bills submitted to Parliament by the government. Efficient and close cooperation with the Ministry of Finance should be mentioned specifically in the electronic exchange of bills on taxes, final settlement and the budget, as well as of the complex tables in annex to the bills.

The government set up a special working group to promote implementation of the Act on the Freedom of Electronic Information. The aim is to achieve transparency of parliamentary procedures and the government's legislative programme from the point of view of citizens. At this juncture cooperation between e-government and e-Parliament is presented and their point connection determined (Hungarian Act XC of 2005).

## Relations with Foreign Parliaments (Primarily Those of European Union Member States)

When determining the tasks to be implemented in the context of the e-Parliament project the question of what kind of electronic connections would be required in order to liaise with foreign parliaments, in particular the European Parliament, the National Assemblies of EU Member States, and with EU executive bodies.

The main platform of connection is the Internet and the electronic mail. These are also the main channels to liaise with various organisations, professional associations and institutions.

In the course of preparation for EU accession, then following accession, liaising with the Hungarian organisations in charge of EU affairs and with Members of the European Parliament (MEPs) has become so intertwined that it is impossible to draw a clear line between domestic and international duties. This is reflected by the following IT tasks, which need to be tackled in conjunction with EU accession:

- From September 2003, still in preparation for accession, European Union documents were supplied only electronically, via the Interim E-Mail System, to the Ministry of Foreign Affairs, whose job it was to forward the e-mails to the ministries concerned and also to the National Assembly. The Office had to devise a system, which provides a designated group of experts in the Foreign Office and in the Committee on European Integration with access to these documents for study and analysis.
- By the end of April 2004, an IT system had to be developed which was suitable for the management of EU documents received by e-mail. This application presented a special development task as interpretation of the metadata of the masses of electronic mail and their uploading to a database could not have been undertaken by traditional methods, thus special robot software was developed to meet this function. The software made it possible that from the moment of accession all pieces of EU legislation could be uploaded to the database of Parliament. Relying on a database, the system had to provide access to MPs, committees and office staff with different levels of authorisation thought a user-friendly Web-based interface.
- The system must support the storage and queries of documents generated in the process of consultations, with links to relevant EU projects and documents.
- Documents received in different languages and formats should be made available in all the formats received. While most of the documents are non-Hungarian, a Hungarian search function should be supported.
- MEPs, who reside alternately in Brussels and in Hungary, raised the need to access specialist materials, documents, official e-mails, and so forth. related to the Hungarian legislative process.

## FUTURE TRENDS

Parliament submitted plans for 2005 in conjunction with the e-democracy programme of e-government, in accordance with the goals formulated in the medium term ICT strategic plan for 2005-2007 of the Parliament. The plans contain further development of current e-Parliament projects and define new projects to be included in the programme.

In 2005 IT projects of strategic significance have been launched, which will provide the most efficient IT tools and support to promote parliamentary procedures and to assist Members of Parliament following the change in the parliamentary cycle in 2006. In this respect mention should be made of electronic administration, which includes parliamentary work processes from handling electronically submitted and certified documents to immediately uploading data that are of general interest to a Web site with search ability at different levels of sophistication.

Taking into consideration citizens' information demands, a longer-term goal can be to provide online access to legislation as published in the Official Journal of Hungary, and possibly in the official journals of specialised areas. The electronic content would have the same legal

effect as the printed version in the Official Journal, which is currently regarded as the attested text. It is to be noted that to our knowledge, this has not yet been achieved at the level of the European Union.

Based on the experiences, an electronic document management system should be developed along with the rules of access to information. PKI-based digital signature and electronic date and time marking should be used to ensure and record the authentication of senders and the time of transmission.

## CONCLUSION

E-Parliament has envisioned meeting expectations related to e-government and e-democracy on the basis of the tenets of eEurope formulated at the end of the 20th century, applying state-of-the-art means available at the beginning of the 21st century. Efforts have been made to serve citizens without being impersonal, so that human and social relations can be fostered to high standards of quality, in keeping with the requirements of an information society.

To this end, the main goals should be carefully conceived and implemented step by step, involving the user groups concerned.

The further development of e-Parliament is inseparable from the provisions of the Information Society Strategy of Hungary. It is continued in keeping with the spirit of the strategy and is closely linked to other ongoing projects related to the creation of electronic public administration.

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## KEY TERMS

**E-Democracy:** A co-operations among citizens, academic, media, commercial and government sectors. New forms of public/private partnership need to be explored and developed in order to realise the democratic potential of new information technology and networks.

**eEurope Programme:** Defines the most important elements of the information society in national and European level like education, culture, social security, public health, public administration, and so forth.

**E-Government:** Goals to achieve better and more inclusive government which means improved services and policies, increased transparency, inclusion, accessibility and accountability or greater participation in decision making.

**E-Parliament:** The entirety of parliamentary work processes and services, which support the legislative activity of the MPs by means of state-of-the-art applications and provide citizens with up-to-date information on parliamentary work.

**European Public Administration Network:** Provides possibilities for the exchange of experience in national e-government activities and deeper analysis of selected topics and offers a forum to all member states to present their activities.

**Hungarian Information Society Strategy (HISS):** The vision, plans and actions through which Hungary will take

the path of a new development and modernisation. The strategy intends to achieve the development of a knowledge-based economy and a modern information society in Hungary, on both state and local levels, within ten years. Its has six key objectives: (1) enter the age of information, as intensely and innovatively as possible; (2) provide a comprehensive vision for the construction of a knowledge-based economy and an information society; (3) promote the growth of competitiveness and successfulness of the Hungarian economy; (4) demonstrate that information and communication technologies are not mere opportunities but effective tools; (5) have a long-term plan and programme for the development of the information society, approved by the government and reflecting the adoption of European values; and (6) provide guiding principles and an organisational framework for designing coordinated plans and operative programmes for developing the information society.

**Social Dimension of E-Parliament:** The relations within Parliament and citizens, civil organisations, other public administration, social agencies and foreign parliaments, supporting MPs' work, Parliament's internal processes, and decision making.

# Role of ICT in Establishing E-Government System for Disadvantaged Communities

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## INTRODUCTION

Information and communications technologies (ICTs) are playing an increasingly vital role in the daily lives of all communities by revolutionizing their working procedures and rules of governance. ICTs offer a unique opportunity for governing elite to overcome the crisis of representative democracy, as ICT and the Internet empower civil society to play its role more effectively and facilitate the performance of governments' main function-serving the people who elect them (Misnikov, 2003). In the realm of government, ICT applications are promising to enhance the delivery of public goods and services to common people not only by improving the process and management of government, but also by redefining the age-old traditional concepts.

Community networking groups and local government authorities are well placed to campaign for greater inclusion for all members of the community in the information society. Possible areas to target include the provision of technology at low or no cost to groups through community technology centres or out of hours school access. There are many possibilities and local government must take a significant role in these activities (Young, 2000).

Information society is based on the effective use and easy access of information and knowledge, while ICT for development (or ICTD) is not restricted to technology itself but focusing on manifold development and diverse manifestations for the people to improve their well-being. ICTD has deep roots in governance, is part of governance and has effects on governance patters and practices at both central and local level.

By recognizing these facts, UNDP focuses on technologies to end poverty at WSIS Cyber Summit 2003, and emphasizes on ways that new technologies can help lift more than one billion people out of extreme poverty (UNDP, 2003). Apart from the four Asian IT giants (Korea, Rep., Hong Kong, China, Taiwan, China, and Japan), most of the Asian countries have fallen under the "low access" category of the Digital Access Index. This has also been referred in the WSIS Cyber Summit 2003, until now, limited infrastructure has often been regarded as the main barrier to bridging the digital divide (ITU, 2003). Among the countries with ICT spending as share of their GDP, Sweden, UK, The Netherlands, Denmark, and France (8.63, 7.97, 7.39, 7.19, and 6.57% respectively during 1992-2001) remain at the top (Daveri, 2002, p. 9), while countries like Bangladesh, Greece, Mexico, Niger, and many more remain at the bottom (EC, 2001; ITU, 2003b; Miller, 2001; Piatkowski, 2002). In a similar research it has been found that in terms of average share of ICT spending GDP, New Zealand, Sweden, Australia, USA, and UK (9.3, 8.4, 8.1, 8.1, and 7.8% respectively during 1992-1999) were among the highest (Pohjola, 2002, p. 7), though most of the countries in the Asian and African regions remain below the average of 5%. The disadvantaged communities in the countries staying below average in ICT spending seem to be lagging in forming appropriate information-based economy and eventually fall behind in achieving proper e-government system.

The e-government system in those countries need to enhance access to and delivery of government services to benefit people, help strengthen government's drive toward effective governance and increased transparency, and better management of the country's social and economic resources for development. The key to e-government is the establishment of a long-term dynamic strategy to fulfill the citizen needs by transforming internal operations. E-government should result in the efficiency and swift delivery and services to citizens, business, government employees and agencies. For citizens and businesses, e-government seems the simplification of procedures and streamlining of different approval processes, while for government employees and agencies, it means the facilitation of cross-agency coordination and collaboration to ensure appropriate and timely decision-making.

Thus, e-government demands transformation of government procedures and redefining the process of working with people and activities relating to people. The outcome would be a societal, organizational, and technological change for the government and to its people, with IT as an enabling factor. E-government should concentrate on more efficient delivery of public services, better management of financial, human and public resources and goods at all levels of government, in particular at local level, under conditions of sustainability, participation, interoperability, increased effectiveness and transparency (EU, 2002).

ICT brings pertinent sides more closely by prioritizing partnerships between the state, business and civil society. A few East European countries have became economically liberal with the high level of foreign direct investment per capita and at the same time became ICT-advanced regional leaders in terms of economic reform. These countries also present the region's most vivid examples of partnerships and collaboration. They have clearly manifested the importance of the public-private partnerships, transparent bottom-up strategies, involvement of all stakeholders, total governmental support, capturing economic opportunities, and enabling electronic mediated businesses, responding to the challenges of globalization.

## BACKGROUND

Electronic government refers to public sector use of the Internet and other digital devices to deliver services and information. As the e-government industry expands worldwide, the complexity and specificity of online services continues to develop. Many nations have sites devoted specifically to e-government, on which they present new initiatives as well as offer listings of services available online. For example, Taiwan, Singapore, and the United States have highly developed portals, which serve as gateways to a plethora to a plethora of government services as well as directories to other specific government sites (West, 2004).

Definitions of e-government range from "the use of IT to free movement of information to overcome the physical bounds of traditional and physical-based systems" to "use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees." The common theme behind these definitions is that e-government involves the automation or computerization of existing paper-based procedures that will prompt new styles of leadership, new ways of debating and deciding strategies, new ways of transacting business, new ways of listening to citizens and communities, and new ways of organizing and delivering information (Pascual, 2003). E-government is a sub-set of the broader phenomenon of e-governance, and can be understand as the application of information technology's tools and techniques to the workings of government for the workings of government for the benefit of its "customers"—citizens and businesses—as well as for itself (Scacco, 2003).

With the proliferation of easy-to-use Internet and Web technology, many federal, state and local governments now provide the necessary instructions and forms for specific services. This facilitates citizens with direct interaction with the desired government service. However, this first phase of digital government efforts has resulted in a fragmented conglomeration of services and information sources (Chun, Atluri, & Adam 2002).

In ways, governance systems are not always neutral to ICTs; they may sometime support or sometime obstruct the application of ICTs for development. The era of the global information society, as brought about by the technological advancement and globalization in trade and economy may create challenges to the society, restrict the development of grass-roots communities; contests the business accomplishment and create barrier to the professional development if congenial policies have not been adopted by the government.

Governance, participation, and inclusion stand to benefit from the networking opportunities and access to relevant knowledge across distances. ICT can finally bridge local, regional and central governments, although it is difficult to separate the work of central government from overall governance practices. If a common platform of e-governance may be initiated, it does not matter much whether the central government provides nation-wide services or a grass-roots telecenter in a remote area services local villagers.

However, the central government need to review regularly its citizen services, retaining only those that are a clear public good, while outsourcing (whether fully or partially) to the civil society and private sector those that are too expensive or difficult for the government to administer or that would simply be better and faster delivered by non-governmental organizations.

### Aims of E-Government

The aim of the e-government policy is to set the enabling framework for the government administration to effectively and efficiently utilize ICT opportunities and to guide the forward move in the right ICT direction along an accelerated path in contributing towards the economic and social upliftment of the nation. It will enable the citizen to be a beneficiary in the global information economy and would create the framework for an e-society to support their economic, learning, and personal needs (e-Sri Lanka, 2003).

E-government may be set to accomplish the following goals that move beyond mere efficiency of government processes to that of overall reform and development:

- Better business environment
    - Technology is a proven catalyst in increasing productivity and economic growth, especially in rural and underserved communities (Konrad, 2002) (remote and disadvantaged). The use of

ICT in government and the establishment of e-government infrastructure assist to create a business-friendly environment at the grass root level. These can be achieved by streamlining the interactions and improving the interfaces between government and business focusing SMEs. By eliminating redundancies in procedures and emphasizing immediate and efficient delivery of services, e-government creates the atmosphere to attract the investors/investment

- Strengthened governance
  - Promoting transparency and accountability in government through the proliferation of ICT in management and operations opens opportunities for better mobilization of resources, efficient decision making and good governance
- Enhanced public participation
  - E-government facilitates swift delivery of information. Mass dissemination of information assists empowerment of citizens and facilitates informed decision-making. Eventually, citizens are made to be more actively involved in the policy and decision making processes of the government
- Improved productivity and efficiency of government agencies
  - Re-engineered management processes and procedures, efficient delivery of services, increased productivity of the bureaucracy, and increased savings are the inherent benefits of e-government system

With its emphasis on the use of information technology in the delivery of services, e-government presents a government agency with the opportunity to re-think how it delivers services. Specifically, e-government offers the agency the opportunity to: examine its current operations and procedures, identify business processes and practices that can be streamlined, implement those streamlined business processes, and implement new technologies that enhance those improvements. In the processes of streamlining business operations, a properly implemented e-government solution provides the agency with the opportunity to focus its resources on service delivery efforts that are most efficiently provided through direct contact versus other means (Pascual, 2003).

The success of efforts in achieving e-government lies in the way that technology is utilized and managed by the public sector. ICT as the enabling tool and with effective deployment it could facilitate the desired results in the long run. Systems, processes and procedures constitute the framework for the usage of ICT. However, the critical factor for the delivery of the desired results is the willingness of the public sector and the citizen to use and adapt to new technology-based environments (e-Sri Lanka, 2003). The government agencies should find innovative ways of working in fulfilling the needs of the people within the information society.

## METHODOLOGY

Stripped down to its bare essentials, e-government is concerned with leveraging and distributing knowledge more effectively government to citizen (G2C), government to business (G2B), and inter-departmentally within government (G2G) (Smith, 2004), including government-to-employee (G2E) relationships.

A country needs to focus on the following areas from the unified perspective of national governments, the telecom industry, and economic perspectives by:

- Making a connectivity breakthrough by expanding networks outside the urban areas
- Developing Web-based online services for the general public
- Providing large-scale Internet and capacity development training for the general public
- Identifying information and content needs and generating local content for social groups, entrepreneurs, farmers and communities
- Encouraging the development of need-based and bottom-up ICT strategies within a defined framework
- Making telecom sector a national priority
- Reforming telecommunications' legal and regulatory frameworks to facilitate nationwide network expansion, lower tariffs, affordable Internet access, higher teledensity, faster application of advanced technologies (broadband and wireless), increased openness and competitiveness in the markets
- Creating a regulatory environment in the telecom industry

The government should have clear concept on the formation of an information society with positive impact on the national economy. The transitional information society need to include the following strategies:

- Modernization of public administration and services
- Improvement in quality of life through the implementation of information technologies in the areas of education, health, environment and communication
- Development of an information technology sector and form a National Task Force to intensify conge-

nial atmosphere for establishment of an information society
- Modify the educational system by including digital content (E-government Strategy, 2002)

E-government services focus on four aspects: citizens, the business community, government employees, and government agencies. E-government aims to make interaction with citizens, businesses, government employees, government agencies in more convenient, user friendly, transparent, inexpensive and effective way.

In e-government system individuals can request for a particular government service and then receive that service through the Internet or some computerized mechanism. The government service can be delivered through one government office, instead of many (as one-stop-service), a government transaction can be completed without direct in-person contact with the government employee.

The following sub-sections would like to constitute the main thrust of this chapter, describing a few parameters that may assist to enhance the e-government system in disadvantaged communities.

## Improved Collaboration

Governments will have to explore new relationships among government agencies as well as partnerships with the private sector and NGOs to ensure quality and accessibility of e-government. Agencies may have to overcome traditional reluctance to work with each other to maximize benefits of scale in e-government projects. Collaboration among government entities, private enterprises and NGOs can assist policy-makers in crafting meaningful reforms and can expedite the implementation of e-government. Private sector experts, who deeply understand topics such as e-commerce, information technology, marketing and management, can advise government policy makers (Sakowicz, 2003).

In this context, four dimensions of e-government may be broadly categorized:

- **E-Services:** Electronic form of delivery for government information, programs, strategies, and services.
- **E-Management:** Information systems supporting the management and administrative functions of public institutions, including data and information management, electronic records maintenance and intra departmental information flow.
- **E-Democracy:** Assist to set agendas, establish priorities, make important policies and participate in their implementation in more deliberate ways (such as e-consultation or e-voting).
- **E-Commerce:** This concept is linked to the business side of government interaction (e-procurement—exchange of money for governmental goods and services conducted over the Internet/Intranet).

## Extensive Participation of Common People

E-government is the use of ICT to transform government by making it more accessible, more effective and more accountable to the common people. By this definition e-government does not mean putting more computers on the desks of government officials. Rather, it concerns the relationship between government officials and people. The reformation may include:

- Providing greater access to government information by making laws, regulations, forms, data collected by the government to be made accessible online; promoting civic engagement by enabling the public to interact more conveniently and interactively with government officials
- Increasing government accountability by making its operations more transparent, thereby reducing the delay in decision making and also reducing opportunities for corruption infiltration; supporting development goals by lessening the time and expense of small business entrepreneurs in their dealings with government, and by providing rural and disadvantaged communities with information and communications capabilities
- E-government is not any more a phenomenon limited only to the richer countries. Some of the most innovative uses of the Internet in governance are emerging from the developing world, as ICTs are increasingly being used to streamline government and connect it more closely with the people en masse it is intended to serve

## Increased Economic and Societal Participation at the Grass Roots

Introducing e-government is a necessity in the contemporary economy. Its advantages are known, recognized, and incontestable. For this reason, the question is not if, but how, to implement and promote e-government in transitional economies by taking into account the significant discrepancies between the capacities of developing countries and those of more developed countries. These include both economic and social factors, not least of which

is the relative absence of necessary specific habits and skills for the successful advance of technology.

The effectiveness of e-government solutions differs according to the stakeholders they address, whether common people of the community, business entrepreneurs or legal entities. The distinct challenge applies to reaching people in general. There are common thoughts of favoring business-oriented e-government applications over people-oriented ones.

However, implementation of an integrated e-government requires resolution of a few practical issues, like, breaking of monopoly on the fixed telephone market; the capacity development for the Internet service providers; raising of computer illiteracy for the government staffs; easy availability of modern payment instruments in electronic form; and the application of electronic signature law.

In developing countries, access to information infrastructure remains always inadequate, and progress on telecommunications policy reforms are lagging behind. Yet there is an opportunity for leapfrogging the new technology can provide better, cheaper links to the grass root stakeholders, while competing global operators can provide low-cost long distance communications. Adopting new technologies, developing countries can deploy telecommunications at lower costs per capita than the industrial world and rapidify poverty alleviation processes (Rahman, 2003).

## Enhanced Transformation

E-government is about transforming the way government interacts with the governed (government, business, people). The process can neither be easily accelerated nor simply can be manifested. It requires a coherent strategy, beginning with a thorough review of the nation's current regulatory environment and the ability of the population to make use of the planned technologies.

The primary motivation for e-government reforms should not be targeted to merely save money or reduce staff. While this can be a valuable output, the savings incurred from e-government initiatives should be the benefit the businesses and people utilizing the improved system are enjoying, rather than the government agencies have invested initially. In order to realize the long-term benefits of the transformation, governments should develop a citizen-centric model involving key stakeholders outside of government- businesses, trade associations, researchers, professionals, academics, CSOs, CBOs, and NGOs.

The success of e-government transformation is not just about the automation of existing processes and inefficiencies. It is the creation of new processes and new relationships between governed and governor. The use of ICT should not be treated as just a cost- or labor-saving tool and simply allotting government officials with computers or automating manual records. E-government is a solution that can revolutionize the process of government within itself. Therefore, government leaders planning e-government projects should first examine the function or operations which they want to apply through ICT.

E-government requires strong political leadership within the government. In order to achieve successful e-government transformation, there must be officials at all levels of government who understand the technology and the associated policy goals with proper motivation to carry out reforms. Strong leadership can ensure the long-term commitment of resources and expertise as well as the cooperation of discrete factions within the system.

## CASE STUDIES

A few case studies have been described in this section to illustrate cases in countries that have successfully adopted policies in their national ICT policies or taken approaches to implement the policies, focusing disadvantaged communities.

Bangladesh, being one of the developing country has integrated the societal participation at the grass root level. Relevant article from Bangladesh ICT Policy is added next for reference (ICT Policy, 2002):

- **3.10:** Social Welfare.
- **3.10.1:** Nation-wide ICT systems will be implemented for rural development activities, agricultural, horticulture, fisheries and livestock extinction for youth, technology guidance for rural enterprise, micro level planning, and so forth. Communicates and user groups or beneficiaries would be actively encouraged to participate in all such activities.
- **3.10.3:** Non-government organizations will be encouraged to establish centers at the village level for providing hardware/software or other support services. At the sometime the Government will use both the formal and nonformula channels to disseminate information about the application, advantages to communities of the use of ICT.

e-Sri Lanka takes a comprehensive approach to using ICT for overall development by promoting the growth of this promising sector, and more importantly by using ICT as an enabler for all the key sectors in the economy and society (World Bank, 2004a). The vision of e-Sri Lanka came about in response to the observed impact in India of the use of technology in development, and in transform-

ing government. It is a concerted effort by the Sri Lankan government to design and implement a comprehensive, nationwide strategy to harness the potential of ICT for the achievement of broader socio-economic goals (Development Gateway, 2004).

*Objective of the e-Sri Lanka Development Project is to promote: (i) use of ICT to enhance growth, employment, and equity through affordable access to means of information and communication; (ii) access to and use of public information and services on-line by citizens and businesses; and (ii) competitiveness of private sector, particularly of knowledge industries and Small & Medium Enterprises (SMEs)*. (World Bank, 2004b)

The Indian experience in e-government can be seen to be evolved in three phases. The first from the late 60s, or early 70s to the late 90s; second from late 90s to 2000; and the third 2000 onwards. The very recent trend of e-government systems in India achieved tremendous success in forming a homogeneous community across the country.

*In the first phase, efforts to develop e-government were concentrated on the use of IT for in-house government applications with a principal focus on central government requirements as defense, economic monitoring and planning, and certain data intensive related to elections, conducting of national census, and tax administration (GOI, 1985). In the second phase, the implementation of the national IT Task Force and State Government IT policies symbolized a paradigm shift in e-governance policies towards using IT for a wider range of sectoral applications reaching out to a large number of people in rural as well as urban areas (Madon, 2003). The third phase has seen the ultimate development of e-government systems in India, reflecting visionary implementation of India Vision 2020 and e-India. Another example for India can be the Government of Kerala's recent policy focus on establishing front-end computerization to trigger the administrative reform, even before the automation of departmental records.*

A statement made by Abraham Sotelo, the coordinator general of the E-Government Programme of Mexico has been quoted here, "E-Government is intended to strengthen the framework of professionalism in public service as well as lower government costs. It will help create a more deregulated government and eliminate a lot of paperwork and bureaucracy. The main objective is to create a high quality government service that is also honest and transparent" (World Report, n.d.).

Among many other successful e-government approaches implemented or adopted globally, IT2000 of Singapore, Digital 21 of Hong Kong, Malaysia Vision 2020 of Malaysia, and Mauritius Vision 2020 of Mauritius are to name a few.

## FUTURE PROSPECTS

E-government offers the potential to bring citizens closer to their government. From 2001 to 2004, e-mail interactions through government Web sites have increased from 73% to 88%. In e-government rating, North America scored 39.2, while Asia has only 31.6 in 2004. Despite this progress, there are still a diverse issues that hinder their ability to reach their full potential in terms of accessibility and effectiveness, especially in many developing countries (West, 2004).

E-government is an expensive tool requiring strong and enduring political will. Without the active commitment of government leaders, states are not assured the allocation of financial resources, the adoption of an appropriate legislative framework or even the most basic human investment in planning and implementing e-government. One strong indicator of political will is the degree of involvement of high level decision-makers in e-government implementation (Misnikov, 2003).

While the myth prevails that all e-government/e-governance initiatives are always costly, this is not true. The implementation cost of e-governance projects may seem expensive, but the cumulative social and economic outcome is much extended. However, there must be efforts and investment plan on the government side to create an effective e-government for providing direct value-added e-services for citizens.

Utilizing ICT to develop e-government will ultimately need to re-engineer government processes and transform governance. It is not enough to deliver services efficiently and effectively by following steps to accomplish certain procedural requirements. It has to simplify government processes altogether, change the concept of governance, and thereby transform the overall relationship between government and people. Increased information access and transparency in government processes leads to greater accountability and credibility, as online or computerized processes remove discretion from government officials and provide monitoring facilities.

Designing security systems for a digital government's multidomain environment requires balancing between providing convenient access and monitoring permissions (Joshi et al., 2001). Developing an evolutionary architecture to integrate large heterogeneous systems poses another challenge. Although these systems support vertical applications, exporting their services requires reengineering their technological services and adminis-

trative processes. The goal is to establish an architecture that coordinates information exchange among government information systems while maintaining each organization's autonomy (Mecella & Batini, 2001).

## CONCLUSION

The integration of ICT into development processes and delivery mechanisms of public and private services necessitates social mobility learning, vigorous planning, local level initiation and the sharing of local and international experience on best practice as pre-requisites. Effective monitoring and evaluation is also a must. It is a proven truth that no blueprint plan will sustain for long with the dynamic changes in ICTs and the degree of adaptation and innovation needed to exploit these technologies.

The strategies, standards, and guidelines on e-government schemes should form part and parcel of the policy and serve as the detailed blue print for the strategy development. The updated policy together with the set strategy is expected to increase productivity, competitiveness, cooperation, and foster innovation in the public sector to leapfrog in the knowledge economy. Successful implementation of the policy would assist the government to be more responsive and accountable to the citizen and achieve greater transparency by providing benefits of increased efficiency and fostering the trust of the citizen for greater cooperation towards the development efforts.

Good governance (including fighting against corruption and for greater transparency) has been identified as a "missing link" both in poverty alleviation efforts and equitable and inclusive economic growth. Its basis lies in good governance: strengthening the diminishing the growing disparities among its members (Misnikov, 2003).

Developing countries cannot expect positive outcomes by following the strategies and building the institutions that served the developed countries in the industrial era. The development challenge in the 21st century will be entirely different to the development challenges of the past century. Indeed, all countries, whether developed or developing, will need to recognize the scale of changes currently underway and design new strategies for these realities (Clarke, 2003). Disparities in rural-urban infrastructure and in hierarchies of economic development are acute in most developing countries and tend to broaden with ICT development, due to high costs of ICT infrastructure deployment in rural areas and also due to limited profit potential of rural markets (Proenza, 2002).

Despite occasional setbacks, digital government projects now appear firmly on the road to fulfilling their promise of making civil and political processes more accessible than ever (Elmagarmid, & Mclver 2001). However, it is estimated approximately 35% of e-government projects in developing countries are total failures and approximately 50% are partial failures (FairfaxDigital, 2004).

Ideally, the ICT tools offer an unprecedented opportunity for community to access information over any geographical distances and across any sovereign state borders. Opportunities for networking and knowledge sharing are also unlimited, regardless of its perseverance. Furthermore, ICTs position in governance systems and practices are becoming widely participatory and inclusive, with endless economic opportunities. Time has come to look backward, take a good view, breath a while, and re-think on strategies, policies, and planning on the developing countries acting locally, regionally and globally along this hopeful road to success and prosperity.

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## KEY TERMS

**Community Networking:** A form of network that brings together the practices of community development, community-based research, health, education, and insights from fields such as sociology, feminism, or library and information and management sciences.

**Digital Divide:** The digital divide is a social issue referring socio-economic gap between communities that have access to computers and the Internet and those who

do not. The term also refers gaps that exist between groups regarding their ability to use ICT effectively, due to differing levels of literacy and technical skills, as well as the gap between those groups that have access to quality, useful digital content and those that do not.

**E-Government:** E-government refers to the use of information and communication technologies to improve the efficiency, effectiveness, transparency and accountability of government.

**ICT:** It is the convergence of information technology, telecommunications and data networking technologies into a single technology, and it is the electronic means of capturing, processing, storing and communicating information.

**ICTD:** It is a term for information and communications technologies for development, an initiative aimed at bridging the digital divide (the disparity between technological "have" and "have not" geographic locations or demographic groups) and aiding economic development by ensuring equitable access to up-to-date communications technologies.

**Information Society:** A society in which economic and cultural life is critically dependent on rapidly developed information and communications technologies and it is integrated by complex communication networks for exchange of information.

**Information Systems:** Also known as management information systems (MIS) is the formal study of the information systems within an organization, consisting of the network of all communication channels. An information system is comprised of all the components that collect, manipulate, and disseminate data or information.

# Securing an Electronic Legislature Using Threshold Signatures



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## INTRODUCTION

Today a significant amount of research has focused on trying to apply the advances in information technology to governmental services. One endeavor has been the attempt to apply it to "electronic voting." Unfortunately, while questionable secure e-voting technology has been widely deployed, the same cannot be said for cryptographic based ones. There is one type of "voting" which has received only limited attention concerning applying these technology advances, the type of voting that takes place within a legislative body. At first glance, it may not appear difficult to institute electronic voting in a legislature, for it may seem that one only needs to apply the traditional security mechanisms that are used to safeguard networked systems, but as we soon outline there will be significant security risks associated with an electronic legislature. One of our concerns is that entities may attempt to implement an electronic version of a legislature without realizing all the risks and implementing all the needed security mechanisms. In fact, there have been occasional instances of some entities attempting to create some electronic/digital form of legislature, for example (Weidenbener, 2004).

In any legislative vote, the legislature's ability to pass or to not pass legislation should be interpreted as the legislature deciding whether to "sign the proposal" into "law." Thus, "law" is a signature; anyone can verify that a "proposal" is a "law" by applying the signature verification procedure. As we move towards electronic applications of governmental services, it is only natural when this is applied towards legislatures we will replace the "written law" by a "digital signature" (here the use of the term law can be replaced by any internal regulation and a legislature by any regulatory body). The underlying aspect of the article is the security considerations that need to be applied when this is implemented.

The question *why consider an electronic legislature* is important. The fundamental reasons for applying today's information technology to government and its services have always focused on that it would bring improved services and allow greater accessibility of government to its constituents. An electronic legislature would most certainly improve the legislative service. It will allow for the legislators to be *mobile*, they will no longer need to be tied to the legislative house to provide representation. Many industrial employers allow their workers to telecommute to work, it is a realization by the employers that these workers are valuable, as well as a recognition that the workforce and the time constraints on the workforce has changed. In many cases, without this option, these workers may leave the workplace. This same reasoning of a valued worker should be applied to our legislators. Further, it does not make sense that today we would allow a subset of the legislature to make and pass laws due to absenteeism, especially in light that many of the required mechanisms to bring about a mobile "electronic legislature" are available. One can argue that by allowing legislators to occasionally telecommute will provide an improved workforce (this argument is motivated by the same reason that private industry utilizes "telecommuting"). We also observe that an electronic legislature should provide the constituents greater access to their legislators. A final argument for an electronic legislature is that it will provide continuation of government in the case of some drastic action like a terrorist attack. In the fall of 2001, the legislative branch of the U.S. federal government came under two attacks. The first attack was performed by Al Qaeda operatives (who it is speculated intended to fly one of the planes into the U.S. capital), and a second attack by an unknown entity who contaminated parts of the U.S. senate (and it offices) with anthrax spores. This second attack was successful in that it denied the Senate the ability to convene for several days. Although such terrorist's attacks on the legislative branch may appear novel, at least in the U.S., such attacks have been precipitated in other countries for some years (PBS, 2001). The U.S. government has recognized the need to develop a means for the continuity of government in the wake of such disasters (Continuity of Government Commission, 2002), one such solution is to utilize an e-legislature.

The concept, model, and a protocol for an e-legislature was first described in Desmedt and King (1999). In Ghodosi and Pieprzyk (2001), the authors described an alternative, which required the use of a trusted administrator. Later in Desmedt and King (2002), we pointed out the weaknesses and disadvantages of the system in Ghodosi and Pieprzyk (2001) and clarified some aspects of the protocol in Desmedt and King (1999).

## SECURITY CONCERNS

One reason to be concerned about the security of an electronic legislature (e-legislature) is that one can "view" the e-legislature as a "network." Represent the legislators as computers/hosts and their communications as the network communications. All problems that affect a network can affect an e-legislature; however there are several more reasons to be concerned. First observe that as a "law making body," an e-legislature and the results derived from its communications need to possess a high integrity. In addition, the participation of members from the legislative body will dynamically vary from time-to-time. Further, since the decisions made by the body (i.e., law) are determined by some fixed percentage of those members present/active, there will need to be some *"transfer of power"* which allows this percentage of the legislators present to pass legislation. For example, suppose that the legislature makes decisions based on majority rules and that the original legislature contains 50 members. Thus 26 legislators are required to approve a proposal into law. Later we have seven legislators absent. At this time, 22 legislators are needed to pass legislation. Thus, there will need to be some mechanism that allows the original body to transfer signing power from the 50 to the 43 (so in the latter case 22 can pass legislation). This in turn becomes a great risk to the integrity of the legislature. The reason is that a legislature is a political body and their members will certainly act this way. The moment at which a transfers needs to occur will be the moment when the risk to the integrity of the legislature is the highest (unless mechanisms are enacted to ensure the integrity).

## THRESHOLD SIGNATURES

As we have described earlier the mechanism that is used to pass a "law" is equivalent to creating a signature, whereas the "legislature" will construct the signature. This is done as a collective body. The first realization question is "how do we model this construction" in an electronic legislature. We could of course provide each legislator with a public-key/private-key pair (Menezes, van Oorschot, & Vanstone, 1996), and when a legislator wishes to vote on a proposal they sign it. If enough legislators sign the proposal then the proposal becomes "law." The problem is that this is unsuitable. First the essence is that this system of law making is generated by a "group-decision," hence the signature should be a *signature created by a group* and not individually signed. There are several other reasons why it is not reasonable to have each legislator individually sign, one is the procedure of verification. To verify that the proposal has been passed one will need to verify each of the individual signatures using each of the individual public-keys, and then they will need to verify that a suitable number of legislators have signed[1]. Since the verification of a law can take place at various times by various parties, there would be a need to "securely store this information concerning who was present and how many." This information would need to be authenticated; hence some signature may need to be applied. But no one party can sign this information otherwise they would possess a power, concerning the signature of proposals (making law), that others don't possess. Thus we need a *signature created by a group* to authenticate this information, but we were trying to avoid such a signature. Consequently, a signature created by a group is required and so we should make the signature of a proposal a "group generated signature" which is called *threshold signatures*.

The next question would be "how do we generate this signature generated by a group?" The solution is to use a cryptographic tool called "threshold secret sharing."[2, 3] The tool is such that a *distributor*[4] generates a single "legislative signing key" and divides it into shares—one for each of the legislators, so that any $k$ of the legislators can reconstruct the signing key[5]. Here $k$ is the quorum number. When a proposal is considered each of the $n$ legislators decide to vote on it. If they decide to vote "yes" they create a *partial signature* by applying the signature generation function with their share. This process of using a threshold secret sharing scheme within a signature scheme is called threshold signature sharing or threshold signatures, for short.

Consider a legislative body $P_1,\ldots,P_n$. They each possess shares of the signing key, so they collectively possess the signing power, for which when a proposal is made this body has the power to sign it into law (as long as a quorum of legislators are present). The number of legislators present will vary from time to time. As long as a quorum $k$ exists (a pre agreed minimum number of legislators needed to be present), a proposal can be passed, according to some fixed percentage (threshold), for simplicity we will assume a simple majority vote. i.e. a $k_t$ out of $n_t$ vote where $n_t$ represents the number of legislators present at time $t$, and $k_t = n_t/2+1$; and so we must transfer from a $k$ out of $n$ vote to a $k_t$ out of $n_t$ vote.

We can support the dynamism of legislator attendance by doing the following: select any $k$ of the legislators present at time $t$. Have each of them independently play the role of a distributor and *share their partial signature* in a $k_t$ out of $n_t$ manner using threshold secret sharing. Then each of the $n_t$ legislators has received $k$ shares. Each of them (for convenience) compresses these $k$ shares to one share.

## NECESSARY REQUIREMENTS TO SECURE AN E-LEGISLATURE

The first requirement is that the "law" is created by having the legislators "partially sign a proposal" and that the signature (law) is generated by using threshold signature sharing. Such a signature is created by using the single legislative key. No one entity possesses this key, but rather this key is shared to the participants by using threshold secret sharing.

Second as the legislature changes in size the transfer of signature power from the original body must be made to the body that is present. This sharing of signature power needs to be temporary. For example suppose the original legislature contains 50 parties. Thus 26 legislators are required to approve a proposal into law. Later 7 legislatures are absent. At this time 22 are needed to pass legislation. At sometime later 49 are now present. Consequently 25 are required to pass legislation. If we permanently shared the secret signing key, then 22 would still be able to sign. We could "ask/require" that these members destroy their old shares. But this would require that 49-22=27 destroy their old shares, the irony is that we require more people to be honest than what the current threshold is (which is 25). If legislators send "shares of their share" to the others[6], then these legislators can continue to use this information to sign later messages into law (those that occur at later times). In fact they can impersonate this legislator in future votes. Temporary sharing is achieved by having $k$ participants $P_{i\_1}, \ldots, P_{i\_k}$ transfer *their partial signatures* instead of their power to sign. Consequently the "transfer of power" (also called "sharing of shares") needs to be message-oriented, and so it is achieved by *sharing partial signatures*.

Third, observe that a few of the $k$ (out of the $n_t$ participants $P_{i\_1},\ldots,P_{i\_k}$ could defeat the process by not properly transferring their power (shares). This would be especially true if the message (law) was such that they had a vested interest that the law should not be passed. Thus, as the transfer of power ("sharing of shares") is message oriented, there is a need for the set $P_{i\_1}, \ldots, P_{i\_k}$ to transfer power blindly (i.e., encrypt the message before sharing).

Fourth, the participants $A_t = P_{i\_1}', \ldots, P_{i\_k\_t}'$, when given an opportunity to act on legislation must know that the outcome ("sign" or "not sign") is a result of their decision and not a result of bad faith on the part of the participants $P_{i\_1}, \ldots, P_{i\_k}$ who had transferred them the power to sign (these are the legislators who "share their shares"). Signature generation should be such that if a signature is not generated then we should be confident that the only possible reason for this was that there were not enough "yes votes." We shouldn't have to wait until voting time to find out that this "sharing out shares" was not fair. Hence, the participants $P_1', \ldots, P_{n\_t}'$ (the legislators who are present at time $t$) need to be able to verify that they were actually given the power to sign that message.

Fifth, no set of participants should gain any information about a motion made during an illegal session, a session where either cheaters have been discovered or the number of legislators present is less than the quorum $k$. Otherwise, they could use this knowledge, to act in later sessions. The point is that cheaters should not benefit. Further cheaters maybe motivated by their political affiliation, and attempt to cheat so that their colleagues benefit, hence no one should benefit. This provides another reason to blind the motion.

Sixth, in a *receipt-required* version of an e-laws protocol, for each legislator belonging to $A_t$ there must exist a record as to how that legislator voted. Note that if each legislator sends a validated partial signature (which we interpret as a valid vote) then this provides a receipt that the legislator voted in favor of the message. We could use the lack of a validated partial signature as a "no" vote.

Lastly, we assume that the network is sufficiently reliable connected, even to overcome any disruption by malicious parties.

## AN OUTLINE OF A SECURE E-LEGISLATURE PROTOCOL

The following is an outline of a verifiable democracy portocol. We omit all technical details, for technical details of the protocol we refer the reader to Desmedt and King (1999).

### Verifiable Democracy Protocol: A Democratic Threshold Scheme

During the set-up, the legislature is empowered with a secret key so that any k out of $n$ legislators can compute the secret signing key. If $n_t >= k$ we proceed with the protocol (we have a quorum), if $n_t < k$ then there are not enough legislators to pass the legislation.

At any time $t$, a message/proposal $m_t$ may be proposed. $A_t$ represents the set of participants present at time $t$, $n_t = |A_t|$, and $k_t$ represents the threshold (the minimal number of participants required to sign).

## Set-Up Phase

### Legislative Key Generation

A secret key K is distributed to the $n$ participants so that a "blinded message/proposal" can be signed in a $k$ out of $n$ threshold manner. In addition to distributing shares of K this distributor generates auxiliary information[7] which is used later to verify "partial signatures." (For example if the protocol utilizes RSA signatures (Rivest, Shamir, & Adelman, 1978) a "test message" is generated and the distributor broadcasts all $n$ partial signatures of the test message. The test message and partial signatures of test message play an important role in the verification of future partial signatures (Gennaro, Jarecki, Krawczyk, & Rabin, 1996). This can be performed by a trusted third party or by the participants using a protocol such as Desmedt and King (1999) and Ghodosi and Pieprzyk (2001).

## Use for Each Law-Proposal

### Blinding Message

The participant $P^*$, who proposes message $m_t$, blinds $m_t$ before they present it to the legislative body $A_t$.

### Transfer of Power: Partial Signature Generation TPSG

As long as $n_t$ exceeds (or equals) $k$, the message will be considered for signing. If so, $k$ participants in $A_t$ are chosen and they generate partial signatures for the blinded $m_t$.

### Transfer of Power: Partial Signature Distribution TPSD

Each of the $k$ participants share out their partial signatures in a $k_t$ out of $n_t$ manner to $A_t$ (we will refer to these $k$ participants as *partial signature distributors*). Each participant in $A_t$ has received $k$ shares, whereupon they compress the $k$ shares of the partial signature to one share. In addition to distributing partial signatures, the partial signature distributors will also distribute auxiliary information which allows the legislative body $A_t$ to verify the correctness of the partial signatures of the blinded $m_t$. If enough valid shares of the signatures have been obtained at this stage, then this will allow one to obtain the signed law. Details of this are now described.

### Transfer of Power: Partial Signature Verification TPSV

The auxiliary information provided in TPSD is first verified by each legislator in $A_t$. Upon verification the auxiliary information is used by each legislator to verify the correctness of their share of the partial signature of the blinded $m_t$. The verification procedure is devised so that with overwhelming probability it can be determined that a recipient has received a valid share this is achieved via a "verification and complaint" protocol. If a verification fails then a complaint will be raised, at that time a cheater has been detected, what remains is a protocol to determine whether the cheater is the "partial share distributor" or the "complainer." The consequence is that the completion of this stage with no complaints implies that the signature power for the message has been transferred to $A_t$ so that any $k_t$ can sign the message. If the cheater is the partial share distributor, it is removed and one proceeds without that party, which is possible due to the sharing technology.

### Unblind the Message

The message is revealed to the legislature. Who reveals the message? $P^*$ could. Or if one utilizes a trusted chairperson as in Ghodosi and Pieprzyk (2001), then the trusted chairperson could reveal $m_t$ (this protocol has several problems, for more details we refer the reader to Desmedt and King (2002)—for example the use of a trusted chairperson is rarely if ever utilized in a legislature). In Desmedt and King (1999), the protocol utilized RSA signatures and so the legislators themselves could unblind the message without the legislators revealing their partial signature of $m_t$.

### Decision: Vote on $m_t$

The legislators decide whether to vote for or against $m_t$.

### Partial Signatures Sent PSS

If any legislator wishes to vote for the by now known $m_t$ they send their share of the partial signature of the blinded $m_t$.

### Verification of the Signature: Determining the Passage of $m_t$. PSV

If $k_t$ or more participants have sent their partial signatures then the message may be passed. If so, the combiner

selects any $k_t$ of the sent partial signatures and verifies the correctness of these partial signatures using the ancillary information provided within this protocol. For each one of these invalid partial signatures the combiner selects one of the remaining partial signatures sent and verifies it. If the number of valid partial signatures is less than $k_t$ then the message $m_t$. is automatically not passed. We have adopted a receipt-required version of the verifiable democracy protocol. The partial signature sends (PSS) together with the partial signature verification (PSV) implies $k_t$ "valid votes."

Who can play the role of the combiner? Any person, collection of people, or even the legislators.

### Message Passed

The message is passed if a signature of $m_t$ can be constructed and the $k_t$ "yes votes" can be verified using the auxiliary information. A vote for $m_t$ is a valid partial signature.

A comment about the verification steps TPSV and PSV in the protocol. The verification procedure TPSV and PSV may utilize different verifiable secret sharing schemes due to the amount of information the senders TPSD and PSS, respectively, know. In TPSD the senders know the shares of the secret key, whereas in PSS the senders know partial signatures. Whether TPSV and PSV require different verifiable sharing schemes may depend on the threshold signature scheme that is used.

## CONCLUSION

The importance of developing an electronic legislature with high integrity requires a careful consideration of the e-legislature protocol. We have provided several requirements that such a protocol will need to possess to ensure this integrity. We have also provided a high-level outline of an e-legislature protocol. One of our main concerns is that one may attempt to implement an e-legislature without giving careful consideration to the security risks, potentially handing over democracies to hackers.

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## KEY TERMS

**Digital Signature Scheme:** A digital signature scheme is a is a public-key cryptographic tool which allows a party to provide origin authentication to a message. It consists of two schemes, a signature generation scheme, where a party can "sign" a message with their private key and a verification scheme where any party can verify the authentication of the signature by using the public-key.

**Threshold Secret Sharing:** A cryptographic tools which allows one to distribute pieces of a secret key to n participants so that: any k of the n participants can

collectively reconstruct the secret key and any set of participants with less that k member cannot generate any information about the secret key.

**Verifiable Secret Sharing:** A secret sharing scheme for which there exists a mechanism which allows the shareholders to verify the correctness of their shares, without requiring them to reconstruct the secret key. That is, by utilizing this mechanism they can be assured that their shares can construct the key without requiring them to reconstruct the key.

**RSA Cryptographic Primitive:** A public key cryptographic primitive that can be used for both public-key encryption and digitally signing. The primitive is such that the public value N is generated by selecting two large, secret distinct primes p and q and setting N equal to their product. Two parameters e and d are determined by: (1) selecting e so that gcd of e and (p-1)(q-1) is 1, and (2) computing d so that e*d =1 mod (p-1)(q-1). Encryption of message m is equal to me mod N and decryption of C is performed by computing Cd mod N.

**Partial Signature:** When utilizing a threshold signature scheme, a partial signature is the data generated by a participant by signing a message using their share of the private key (secret key).

## ENDNOTES

1 Recall that this "suitable number" is dependent on some fixed percentage of those legislators that are present/active.

2 One method to construct a threshold sharing scheme is to utilize a polynomial construct method within a field (Shamir, 1979).

3 The importance of using threshold sharing to construct a group signature was independently developed in Boyd (1989) and Desmedt (1988).

4 Technology exists to avoid the need to rely on a single distributor, that is, using several distributors.

5 Of course the legislators will never reconstruct the signing key, what they will do is, use this information to construct a signature.

6 Rather than sharing out their partial signatures, the participants could share out their shares of the secret signing key.

7 This ancillary information will be broadcasted to all, that is, public record. The nature of the ancillary information is dependent on the verifiable sharing scheme that is used. In Desmedt and King (1999) we utilized the RSA signature scheme (Rivest, Shamir, & Adelman, 1978), so the ancillary information was based on this assumption of RSA and using a verifiable secret sharing scheme for RSA.

# Skilling for E–Government



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## INTRODUCTION

Implementing e-government in local, regional, or central administration represents a far-reaching modernisation of governing the public affairs. Therefore, in training it is not sufficient to train users in new programs as in the case of f.i. further training in a new office application. To understand and actively influence the restructuring that, by necessity, goes along with the introduction of e-government a broader approach in e-skilling is needed.

For Grabow, Drüke, H., and Siegfried (2002), e-skilling is one of the ten factors for success in local e-government. Schelin (2004) goes into the same direction when she points out: "With the era of digital government upon us, Federal, state, and local governments need to prepare their elected officials and employees to handle the multitude of changes incorporated into digital government. However, the lack of training opportunities, as well as the lack of research dedicated to training for digital government, is ominous for successful digital government endeavour ..." (Schelin, 2004, p. 273).

Whereas Schelin in this encyclopaedia, presents the content and methods of an advanced training module this contribution focuses on the competencies that are required to enable the different user groups to be up-to-date for the new challenges that are ahead of them.

In accordance to that approach in the first chapter the basic challenges that different user groups have to face when being confronted with e-government as a comprehensive modernisation concept.

## BACKGROUND: E-GOVERNMENT AS A COMPREHENSIVE MODERNISATION CONCEPT

In local e-government these secular developments of the last few decades are drawn together, e.g. the rapid progress of information and communication technology (Garson, 1999; Grönlund, 2000), globalization (Carnoeiro, 2000, Valenzuela, Vázquez, & Lorente, 2001), the declining importance of ideologies[1] (OECD, 2000), new opinions on the reasons for efficiency in organizations (Baldwin & Clark, 1997; Daft & Lewin, 1993; Harrison, 1994; Kogut & Bowman, 1995) and a changed understanding of the relationship between the state and society (Carnoeiro, 2000; United Nations, 2001)[2].

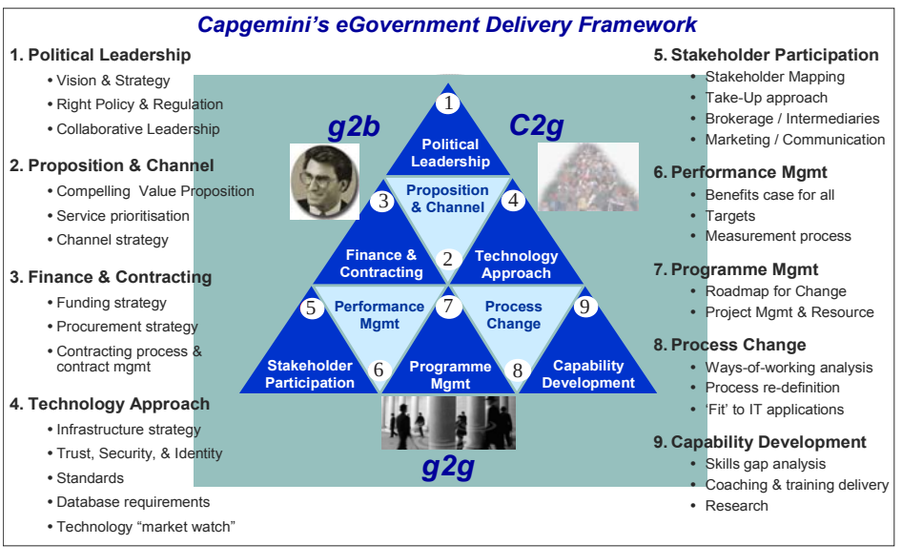
As the OECD (2003) phrases it, the main effect of e-government is "simply better government by enabling better policy outcomes, higher quality services, and greater engagement with citizens and by improving other key outputs identified. Governments and public administrations will, and should, continue to be judged against these established criteria for success" (p. 12).

E-government has a high global priority. The subject is regarded as a central national task: programs, strategies, and institutions are being established or adapted. This high awareness in itself encourages the development of local e-government. In a sense, e-government creates a second chance for administrative reform. This is partly because some of the same subjects are on the agenda and partly because the establishment of the virtual town hall, if it is done systematically, also involves modernizing the administration.

Strictly speaking, e-government even goes a step further, because it aims to restructure the internal processes from the customer's perspective to a far greater extent than was planned in the administrative reform. According to Hill (2002), e-government also goes beyond the previous administrative reform in its greater focus on services (e.g., its life episode approach with integrated services) process improvement by e-government and a "reinvention" of administrative action with new organizational forms and new methods of service to the public.

The use of information and communication technology lends great support to the administration in all reform processes. As a result, it will be possible to put the goals of administrative reform back on the agenda—goals such as increasing the effectiveness and efficiency of the administration, citizen and customer orientation, a greater service quality and an increase in the transparency of the tasks, improved working conditions for the administrative staff, reminding staff of the goal of pooling subject and resource responsibility in a coherent e-government project and transforming this into fresh motivational impetus and renewed activity.

*Figure 1. The e-government delivery framework*




## THE E-GOVERNMENT DELIVERY FRAMEWORK

A proven concept to understand the structural factors influencing e-government conceptualization and implementation on any level be it local, regional, national, or supragovernmental, is the Capgemini eGovernment Delivery Framework which will be explained in the following.

The "eGovernment Framework" captures the main building blocks of e-government with all in all 29 subcategories which cover the main aspects that have to be taken into consideration when building up e-government. The categorization starts from the fundamental assumption that e-government is more about organization than about technology. Only if perceived as a comprehensive modernisation concept e-government can generate the massive results it can have. Any of the aspects is indispensable when e-government is led to a success.

- **Political Leadership:** Comprehends the foundation of any e-government project on a solid and well-communicated vision and a clear strategy. Rules for all participants are made clear and the leaders execute a collaborative style of cooperation with internal and external process participants.
- **Proposition and Channel:** Deals with the processes to address the different user groups. The main questions here are: what is the value proposed to different user groups, which services are to be prioritized according to what criterion. A multi-channel strategy should be implemented.
- **Finance and Controlling:** Asks for the strategy and concepts to organize the supply chain in e-government (funding, procurement, contracting).
- **Technology Approach:** Assembles the aspects to use the right technology such as middleware, security, standards, interoperability.
- **Stakeholder Involvement:** Broaches the issue of the appropriate ways and concepts to involve the main stakeholders into e-government projects during the whole life cycle.
- **Performance Management:** Asks for the methods, instruments and tools to measure the economic, societal and political impacts of e-government.
- **Program Management:** Covers the classical project management issue.
- **Process Change:** Explores the central role that business process reorganization plays in e-government.
- **Capability Development:** Touches the issue of permanent further training of both the individuals and the organization to cope with the demanding challenges that e-government poses.

This cascade of features ensures a structured and comprehensive coverage of the topic and provides a basis for skilling. With the aspects laid out in the e-government delivery framework generic as well as specific require-

ments and contents of skilling for different user groups are given. Generic skills and competencies would comprehend project management, performance measurement, financing, and contracting and the like. Specific issues are strategy, proposition and channel, technology, process change or stakeholder participation. In other articles, the requirements for different user groups are described along the perspective elaborated in the theoretical concept of another article.

## COMPETENCIES FOR DIFFERENT USER GROUPS

Involving the employees in the set-up of e-government is indispensable. Even councils and heads of administrations must be motivated—if needed—to support the overall e-government project. Online offerings—posted on the Internet with the best intention—serve their purpose only when accepted by and encountering interest among citizens and local businesses. Achieving this on a sustained basis assumes an easy Internet access and a certain level of "Internet literacy."

Qualification is therefore needed by several groups. As for the own staff, councillors, and heads of administrations, this need can be identified with a survey. The evaluation of the results provides then the basis for planning and implementing measures.

In view of the citizens and all small and medium-sized companies, supporting measures for qualification and competency improvement help to avoid a "digital divide" in the society.

### E-Skilling for the Staff in the Public Administration

Without know-how of and active support from the employees, e-government is not feasible. Their ideas and tips are needed. But it is also important that they recognise and understand the radical changes e-government brings about in terms of processes, responsibilities, content-based and psychical requirements, and social interrelations. Motivation and qualification measures help to get employees out of their (in case of innovation, "classic") role of affected people and turn them into actively involved staff.

Essential are the capabilities and skills needed to deal with the new possibilities in a targeted fashion and positively influence the general conditions in the own professional sphere of action. Conveying and strengthening relevant competencies represents the overriding objective of all development measures for human resources.

E-government, in the first place, means increased electronic support in the execution of tasks. The use of information and network technology—Internet, Extranet, and Intranet–requires relevant competencies and qualifications. The widely available knowledge of Office applications may serve as a basis; they are, for example, also a prerequisite for acquiring the European Computer Driving License. In addition, the employees need to master corresponding functional applications, groupware, content management, and document management programs for e-government.

Overall, it is about improving the employees' capabilities and skills of handling the new technical possibilities and positively influencing the general conditions in the own professional sphere of action. Conveying and strengthening relevant competencies represent the overriding objective of all development measures.

These competencies include social skills, personal skills, and media skills:

- *Social skills* in terms of ability to understand and shape the own social environment
- *Personal skills*, meaning the ability to establish and maintain working relationships in the professional arena, develop as individual, co-operate with others, and lead as manager
- *Media skills* as technical-practical capability and skill, including critical reflection on benefits and limits of technology (systems)

Qualification measures must be planned systematically and incorporated into the human resources development. This also includes the systematic capture of strengths and weaknesses of each employee and the entire work area. The related training must allow for various methods and be based on a target agreement within the administration. The works council must be involved in the planning activities. For the operational implementation, a qualification plan—relating to both the work area and individual employee—must be developed.

Moreover, the human resources systems should be aligned in a way to better respond to the requirements resulting from the introduction of communal e-government. Within the scope of the possibilities given in public administration, incentive systems and career planning must also be aligned.

E-government changes processes and organizational structures. It reshapes activities, forms new work groups, and rearranges obsolete work areas. As a consequence, some competencies become obsolete, other and new qualifications become relevant. With e-government, virtual worlds of work arise, particularly in form of extranet co-operations and in corporate-like networks. Tele-working and work forms with new time management will emerge, which in turn requires new competencies.

More than before, employees need co-operation and communication skills as well as process chain orientation when performing sub-tasks. Internal and external customer orientation becomes a principle of action.

In projects, employees must increasingly work together with internal and external partners; especially co-operations with external players will rise. These can be own operations, "hybrid forms" of formally independent companies, but factually depending on the administration, or even "classic" private enterprises. The orientation in such co-operations is aggravated by the variety of interests, attitudes, experiences, and content requirements.

The working process must be designed as an environment that nurtures learning to support competence development via active learning or "learning by doing." This particularly includes (informally arranged) possibilities to exchange experience with problems around new applications and administrative procedures with colleagues, managers, and IT managers and search and get help during daily business. Executives are invited to expressly encourage their staff to do so.

More formal activities such as the involvement in projects on the changes in the working process and/or the continuous development used by larger employee groups are meant to enhance their competencies and increase their motivation. The practice in Tameside (United Kingdom) demonstrates the benefit of a continuous training vs. a training that is being carried out only when it is urgently needed.

*To date, over 1,000 Tameside staff have completed the 'Continual Improvement' training program, and IT training in the region of 1,200 delegate days is provided annually each year by the in-house training team. This training is predominantly for front-line staff to equip them with basic IT skills. More than 1,000 staff have been trained in the tools and techniques of statistical process control and systems.* (Socitm & I&DeA, 2002, p. 147)

The employees must be addressed differently; therefore, different measures must be planned and taken. This results from the wide range of objective prerequisites, such as task, formal and effective qualification of the employees, and subjective factors, such as attitude towards work, profession, and changes. Accordingly, the qualification strategy will have to contain differentiated qualification plans in terms of content and time.

In the human resources development trainings, the whole set of state-of-the-art methods and instruments should be used, including e-learning, the self-directed learning handled in tele-operation via standardised learning programs. In an e-government strategy, "classic" and new methods are integrated in the "blended learning" concept.

In some foreign municipalities, the enhancement of competencies is addressed with employee rotation from the original work area to another municipality (like in Tampere/Finland), or from public administration to a private business (like in Liverpool, UK) or privatised company. In Tameside (UK) teams of employees work in other municipalities for about three months for the general IT introduction and co-ordination between back-office and front-office when introducing e-government. "In order to maximise the transfer to recipients, a certain amount of technical expertise will be needed to tailor the Web site and associated software for local conditions and to ensure it is further maintained and develop thereafter. To facilitate this technical staff from partnership, Councils will be seconded to work in Tameside for a period of around 3 months, during which time they will become familiar with software and do the initial tailoring work. It is also likely that staff from TMBC will be seconded to other partner LAs [Local Authorities, HD] to facilitate joined up working within the partner LAs. At the end of this period, the Web site will be installed and developed within the mentoring council.

During this same period, a parallel secondment of staff for up to 3 months will take place to familiarise staff with the toolkits, templates, and processes for implementing e-government via a front office. This is vital work in re-engineering processes to ensure front and back offices work in concert to improve services to the citizen." (www.idea-knowledge.gov.uk)

## E-Skilling for Management of Public Administration

Also, the executives must acquire competencies, qualifications, and capabilities on e-government. First, they are requested to enhance their media competence and align it with the new need. They must be able to handle new programs, specific applications, group ware services, and database systems. Second, they must understand the applications and functionalities to an extent enabling them to take decisions on the resource allocation and task distribution in their work area—even if they do not personally use these applications and functionalities.

Third, the executives will have to control on their own the restructuring of the information and knowledge management inevitably resulting from the introduction of communal e-government.

The competencies specifically required by the introduction of e-government also include the application of control techniques: both in terms of an in-depth understanding of project management and business tools of controlling, the evaluation and success control. Particularly required in times of changes is the ability to motivate

the staff and build teams. Executives need leadership competence also to steer change processes in large-scale projects and for change management. Last but not least, managers must recognise, convey, and consider in their action the significance of gender-specific vocational training.

The further training concept of Espoo (Finland) is exemplary under the aspect of the transfer of competencies and capabilities for e-government: "Top management in the city administration have been given training in the use of management support systems. In addition, they were due to attend e-management training for about 112 days in 2002. This training program was fairly comprehensive, divided into five major thematic areas:

- Introduction into digital environment and models
- Management of change and the utilisation of interaction and openness in the net
- Networking and strategic partnerships
- Provision of services and products in the net and management of customer relations (changing customers, CRM, learning from customers etc.)" (Anttiroiko, 2005, p. 46).

In times of change, the ability to motivate the employees and to organise team working is especially required. The competence to lead people and to control change processes in big projects as well as in overall change management is needed. The council of the Finnish town of Tampere has passed a comprehensive training concept for public managers that focuses on computer skills as well as on management skills. The description of the major topics of activities underlines the broad perspective on the e-skilling that is required for management. "Financial management (budgeting, costs, planning the income statement); partnerships, shares; risk management; human resource management: how to manage information, the role of incentives and motivation, policy of wages and salaries, labour relations: labour relation laws, system of collective agreements, local contracts, and negotiations." (http://www.tampere.fi)

## Skilling for Companies

The first—and doubtlessly reasonable—question is why public administration should invest into further training for private companies at all.

To facilitate and support further training for private companies is a need especially in the case of small and medium-size companies. Only using state offers these actors can take full profit out of e-government services. Take-up of e-services or the building of virtual cooperation networks by using e-government technology is underdeveloped among small firms in handcraft as well as in the service sector. These potential users are systematically disadvantaged in terms of market observation, market entry, and defending their market position but are not able to reap the potentials given by e-government to address just these issues.

Therefore, public bodies and authorities should present wherever they can—as in the case of schools, libraries, and adult training facilities—measures for further training. So, it is possible to simplify the technical processes of access and of usage of e-services and adapt the content of e-skilling to the special needs of this group.

The so-called "power users" defined as users with frequent online contact are expected to have little problems with medial competencies to use e-government services. In the professions like freelancers in the tax sector, in the legal sector or in retailing online contacts with public administration have become quite normal.

## Skilling for Politicians

Politicians and especially parliamentarians and—on the local level—councillors must be enabled to take well-founded strategic decisions on e-government and use applications on their own.

Qualification measures must first aim at giving the parliamentarians and councillors a comprehensive overview of the e-government project, its opportunities and risks, prerequisites and general conditions. In their role as users, the parliamentarians and councillors must be instructed in enhanced Office systems, council information systems, knowledge management system etc.

In the use of Internet to improve the work of politicians Estonia has achieved a level that is unique worldwide. Since August 2000, the meetings of the cabinet have been carried out with the help of the Internet. One result is that the files are prepared more focused and another result is that cabinet members that in the past could not take in the government meetings because of their absence can now be involved due to the linking up via Internet. Tallo observes that "in the cabinet room you won't find any paper—but instead a LCD for each minister" (p. 46).

## Managing the Digital Divide by E-Skilling

Motivating and qualifying the citizens and private economic players are important tasks to make them familiar with e-government. These groups may not be excluded from the acquisition of the relevant knowledge. This, on the one hand, is a political task, as the digital divide must be put into a perspective. On the other hand, the investments in e-government must pay off, which requires a

wide participation of a large share of the population (or in other words: achieving economies of scale in e-government assumes a high number of users).

Citizens and private economic players should acquire the competencies needed to use applications in e-government, above all media competence. In recreational facilities with supported PCs, homes for the aged, youth clubs, housewife clubs, immigrants' hangouts, culture clubs, schools, adult education centres, and libraries, the public administration has the opportunity to exert direct influence on contents, human and financial resources.

In Liverpool (UK), resources are made available for learning in education facilities, at publicly accessible places, and online.

*The three city learning centres in Liverpool are a key element of the Excellence in Cities initiative and have a major impact on learning in city schools by providing a focus for the very best in education for young people. They provide outstanding local facilities, which are improving education standards and skill levels, so promoting employment opportunities and enabling the social inclusion agenda. The centres are linked into the community grids for learning and give students low cost online access and central learning resources, from home, from libraries and from other public access points.* (http://www.idea-knowledge.gov.uk)

When implementing education for citizens, there are no limits to imagination. In Okoyama, Japan, former teachers are mobilised as "information volunteers" for IT education:

*The information volunteers are the lecturers for the IT class for the citizens and/or support the citizens' IT use. With the collaboration of the private sector, educational institutions and welfare organs, the information volunteers are publicly recruited at the earliest possible date among the retired ex-public officers, ex-private company employees, and from other relevant institutions.* (Fujita, 2005, p. 226)

In Tameside, UK, different population groups are specifically addressed in a systematic qualification concept:

*There is a commitment that all citizens of Tameside who want to work should be qualified to the European Computer Driving Licence standard: as a part of this initiative a junior version of this qualification is being implemented in primary schools. Additional funding has been secured to develop the Tameside passport to learning; an Internet-based individual portal that will provide a managed learning environment to take people from basic skills through to further and higher education.* (Ferguson, 2005, p. 179)

The problem that some classes of population with a low level of education cannot be activated to visit measures for further education is addressed by the innovative organisation concept of the Internet bus. In Tampere, Finland, the Internet bus offers non-mobile population groups the possibility to use the Internet, e-government applications, and further education:

*The city has provided extra resources for training providers. From the city's point of view, the special target groups are senior citizens, minorities, inhabitants of suburbs and children, whose teaching in computer skills have been increased in schools. The city itself has contributed to this area by the Internet bus called Netti-Nysse. It can be booked free of charge for any group wishing to learn to use the computer and to utilise the Internet. The bus itself has two parts: in the front, there is a computer room with 11 computers with the mobile and W-LAN connection to Internet, and in the back, there is small auditorium with a data projector, screen, and comfortable chairs.* (Anttiroiko, 2005, p. 48)

A similar solution is followed also in Liverpool, UK: "LCC [Liverpool County Council] launched an ICT bus in May 2002 to deliver ICT taster sessions across the city. The bus has full Internet access through wireless connectivity. The idea behind the project is to provide access to IT systems and the Internet and wherever access to services may be deemed difficult, or where there are large numbers of Liverpool residents. The bus is visiting places such as shopping centres, residential homes, schools, and institutions." (http://www.idea-knowledge.gov.uk3).

## INNOVATIVE METHODS FOR INNOVATIVE ADMINISTRATION

In the people development trainings, the whole set of state-of-the-art methods and instruments should be used, including e-learning, the self-directed learning handled in tele-operation via standardised learning programs. In an e-government strategy, "classic" and new methods are integrated in the "blended learning" concept.

When selecting the methods for further training the guideline must be according to the actual discussion in didactics: it is not about results but about initiating activities and processes. Only as part of a mixture of methods it is acceptable to have the classroom-based delivery and the classic tuition from the front. Learning, instead, has to be implemented as an inherent part of the everyday activity on the job. To achieve that an environ-

ment that fosters learning has to be set up characterised by learning with the task, acceptance of trial and error, failure tolerance and the application of mentors or tutors.

Organisational measures also make sure that learning is not perceived or misunderstood as something that distracts from "actual" work, as boring or luxury. In the face of tight budgets, learning on the job—being more cost-convenient than classic seminar classes—has good realisation chances.

To jointly clarify questions and issues of general interest, a "time-out" of five to ten minutes can be planned. With regular quality and training circles of only ten minutes per day in the core time, continuous learning can be easily integrated into every-day work. With graphical illustrations, for example, on the relationship between difficulties encountered and solutions developed over a specific period of time, progress in problem solving can be made clear.

Hardware and software, learning environment, trainers' team, training methods, and learning atmosphere must be co-ordinated and updated. Devices and programs used in training measures should by no means be technically outdated. When selecting trainers, it should be made sure that they have practical experience with the use of hardware and software in work environments, in addition to theoretical knowledge.

A gender-specific learning environment must be created: women "learn differently"; the specific conditions relevant for many women, such as childcare and part-time activity, must be addressed.

With growing levels of online usage at the desktop and at access points in libraries and learning resource centres, e-learning can increase access to end-user ICT training, whether for a formal qualification such as the European Computer Driving License (ECDL) or for new systems training like CRM (customer resource management). Many high street banks for example have begun to provide e-learning on their Web sites to educate customers on their services.

E-learning covers a broad set of applications including online training and education (e.g., Internet and Intranet), computer-based training including CD-Rom and digital collaboration. It can provide major benefits to public administration at a time when the need is greatest. E-learning can underpin rapid transformational change by quickly delivering targeted training and consistent messages right across an organisation in a way that gets into peoples heads.

## FUTURE TRENDS

From the analysis it comes quite clear what the future trends are. Firstly, the front-loading approach, for example, the learning once for all in primary school or in academic institutions, belongs doubtlessly to the past. Who does not get into constant learning will get keep on the running in terms of the skills and competencies needed to be an asked-for employee. Secondly, e-learning will expand and gain in importance compared to the traditional learning method. Blended learning is not only a fashionable expression but the appropriate description of the approach that is needed to keep up with the growing demand for learning.

What is not so clear are two other points. The first is if the digital divide as the gap between those that can and will work with the computer and have the abilities to make full profit also from e-government can be relativised. The second is if in training concepts for e-government the whole range of aspects and themes especially dealing with the comprehensive claim of e-government will be considered in the future. The risk is that as before skilling sticks to the traditional understanding of learning in IT as learning how to use new software.

## CONCLUSION

Theoretical considerations make clear that e-skilling is essential in order to make e-government a success. E-government as a comprehensive modernisation concept for local, regional, and central administrations is likely to change structures, habits, and living patterns profoundly. For those who want to take part in it and want to play an active role in the change process the training in new skills and new competencies is essential. And for those who continue to be reactive or tend to exclude themselves from the new area of living it is the state's task to avoid digital divide and make sure that no major group of the population stays out of the circle.

Empirical evidence that has been laid out widely in this contribution proves that e-skilling works as long as decision-makers in public administration are led by the broad perspective on e-government. Examples from the most advanced countries such as Finland and United Kingdom are likely to get into the process of exploring innovative methods and measures. E-skilling is a success factor for the implementation of e-government as long as it is conceptualized systematically and with a spirit of engagement. Money is not necessarily a hindering factor to organise a systematic e-skilling process. In Estonia, the KOOK@World foundation established by Estonian companies "trained over two years more than 100,000 Estonian people in the use of PC and Internet. That equals more than ten percent of the adult population. As a consequence, the Internet penetration increased significantly." (Tallo, 2004, p. 46)

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## KEY TERMS

**Blended Learning:** Means the combination of learning in class (in a personal contact) and of learning assisted by a tele-coach (online over the Net) (e.g., in self-learning centres). "Blended Learning" includes assisted learning, a pedagogic-didactic approach, ensuring an environment that nurtures learning, mentoring, and mitigates the threat of self-isolation.

**ECDL:** The European Computer Driver's License certifies to a user that he is in possession of basic skills to work with the computer that every employee in Europe needs. The ECDL is an initiative of the Council of European Professional Informatics Societies (CEPIS ) in cooperation with the European Union (EU). The activity is organised internationally by the ECDL foundation in Dublin (Ireland). Since the European Driver's Licence is a certificate that is accepted all over Europe, only

authorised training institutions are allowed to carry out the ECDL examines.

**Media Skills:** Stands for a) technical-practical capability and b) skill, including critical refection on benefits and limits of technology (systems).

**Personal Skills:** Comprehend the ability to establish and maintain working relationships in the professional arena, develop as individual, co-operate with others, and lead as manager.

**Social Skills:** The ability to understand and shape one's own social environment.

## ENDNOTES

1 "The collapse of ideology no longer allows governments to use stock ideological responses to society's problems. Instead, governments should learn to mange flows of present and past perceptions" (OECD, 2000, p. 36).

2 "There is growing discomfort with existing arrangements of government. Citizens demand greater democracy and transparency. Communities seek more autonomy. Business leaders point an accusing finger at the lazy pace of governments. Interest groups are prodigious in showing displeasure with the way governments resolve their disputes and issues. The media are eager to report dissent and nurture mistrust. Lack of effective governance ranks high on the list of major societal concerns" (Carnoeiro, 2000, p. 93).

3 See also Ferguson (2005), p. 177

# Social Critiques of Electronic Voting

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## INTRODUCTION

The use of computers in the electoral process—to count punch-card ballots, or to maintain a register of voters—has been in place in many countries for some time. We now see many countries move to more thoroughly integrate computers into the voting experience, by introducing what are commonly known as "electronic voting" systems. The use of such systems in public elections combined with the role of voting in creating and maintaining democratic institutions requires that we pay attention to the impact that changes to the electoral process have on the construction of the public nature of elections.

## BACKGROUND

The essential characteristic of an electronic voting system, as discussed here, is that voting takes place through the use of a computer or specialized electronic interface—commonly called direct recording electronic (DRE) equipment. Such systems usually also collate votes and calculate results through electronic means, but this latter characteristic is shared with other systems not considered here (Cranor, 2001). In restricting ourselves to systems with an electronic interface, it is important to note essential differences between electronic voting in polling stations, voting in kiosks, and remote Internet-enabled voting where voters can vote from any Internet-enabled computer (Chen, Roberts, & Gibson, 2002). Although all three forms constitute electronic voting and introduce computing technologies to the voting process, they have quite different impacts.

Media attention to electronic voting often focuses on system failures, and expert-driven critiques of the technical shortcoming of the various systems, such as the need for a voter verified audit trail (VVAT). Social critiques, if considered at all, are often relegated to anecdotal accounts of the ease of use (or lack thereof) of the system. However, much of the rationale put forward for the transition to electronic voting presumes a social critique, such as arguing that "the practice of voting … has not kept pace with social and economic change" (Pratchett, 2002, p. 4). It behooves us, then, to interrogate the social impacts of electronic voting, given particularly the centrality of voting to our social and political structures. In doing so we focus on three main aspects. First, we examine general social critiques of technological development and the implications of these for discourse around electronic voting. Second, we examine the impact of electronic voting on the public nature of elections. Third, we examine issues of usability and participation. There is, necessarily, overlap between these various areas–both questions of public space and usability can be understood to turn on the issue of accessibility and inclusivity–but these headings provide a convenient point of departure for a consideration of the questions to be addressed.

## EXPERTIZATION AND TECHNOCENTRIC DEBATE

Much analysis of electronic voting stems from a neutral conception of technology, divorced from any consideration of the cultural context of technology's production or consumption. Linked to this is a belief that any problems with the implementation of a technology are technical in nature, and can be addressed by technical fixes. This frame can be used, for example, to explain debate over the need for—and means of implementing—a voter verified audit trail in electronic voting systems. Alternative approaches arise from those who view technology as existing primarily within a cultural framework. Kling, for instance, challenges the "tool" metaphor, arguing (1996, p. 20) that "part of what is required … is a willingness to examine computer issues as part of a larger socio-technical system, not just as a component." For such theorists an exclusive concentration on, for example, cryptography, or questions in computer science has at least three troubling aspects. First, it ignores issues that cannot necessarily be considered within a technological frame, such as the nature of the public-private divide or the interplay of technology and culture. Such issues form the basis of the remaining sections of this article.

Second, a neutral conception of technology is tied to a view that newer, more "high-tech" solutions are somehow necessarily better, by virtue of their novelty and innovation. Such an approach doesn't accommodate a belief that a technology may be "sufficiently advanced" or that technological innovation is not synonymous with

progress. One report, for instance, chides voting processes (Pratchett, 2002, p. 4) explicitly for having "changed very little in over 100 years." Illich has criticized the cycle of obsolescence that emerges in a society where:

*Periodic innovations in goods or tools foster the belief that anything new will be proven better….The "better" replaces the "good" as the fundamental normative concept.* (Illich, 1973, p. 74-75)

Illich is wary of a situation where "a few corporate centers of decision-making impose compulsory innovation on the entire society" (1973, p. 73) and concerned with the manner in which a certain form of technology gains what he calls a "radical monopoly" over the accepted range of approaches to social innovation. Efficiency and speed, modernization, an image as a technologically advanced society: all become aims in themselves, irrespective of whether they are needed to address identified problems. A more techno-skeptic approach would prompt greater scrutiny of, and skepticism about, the rationale for introducing electronic voting, asking, for instance, whether its introduction is focused on a necessary change, or whether it is the most effective solution to identified problems with the existing system. To what extent might electronic voting circumscribe or influence the possibility of future choices, such as–to take a topical issue in the U.S.—the introduction of instant run-off voting?

Third, full engagement with the issues raised within a technocratic framework frequently requires a level of expertise and knowledge that serves to exclude most people from discussion concerning matters of great public importance. In a similar vein, Mercuri notes in relation to electronic voting that:

*Electronic balloting and tabulation makes the tasks performed by poll workers, challengers, and election officials purely procedural, and removes any opportunity to perform bipartisan checks. Any computerized election process is thus entrusted to the small group of individuals who program, construct, and maintain the machines.* (Mercuri, 2001)

## PUBLIC-PRIVATE DIVIDE

Apart from the purely functional matter of electing officials, elections are seen by some to act as a legitimating ritual (Hoffman, 2000; Oostveen & van den Besselaar, 2004), serving as a symbolic process that both acknowledges and, in doing so, creates the "public." One can usefully ask how adoption of electronic voting—particularly Internet voting—might affect the significance of voting as "a symbol which unite [sic] people in a common commitment toward democracy" (Monnoyer-Smith & Maigret, 2002, p. 283). There seem to be two related issues at play in such a critique. First, by removing the solemn, and sometimes arcane, aspects of the ritual of voting we risk obliterating the cultural markers that identify an election as an important social act. Some observers (Schaffer, 2002) go so far as to suggest that moves designed to "clean up" elections may, perversely, be linked to disenfranchisement and demobilization. Second, voting becomes increasingly refigured as an individual act. Barber already criticizes the existing system of secret voting in representative democracies:

*Our primary electoral act, voting, is rather like using a public toilet: we wait in line with a crowd in order to close ourselves up in a small compartment where we can relieve ourselves in solitude and in privacy of our burden, pull a lever, and then, yielding to the next in line, go silently home.* (Barber, 1984, p. 188)

With Internet voting we do not even need to attend a public place, thus reducing even further the social nature of the act of voting. However, this is also true with absentee or postal ballots, and so this criticism, as leveled at Internet voting, is perhaps best understood as one of remote voting generally. Barber's dislike of the secret ballot is, it should be noted, somewhat unusual, but it does raise the question: why secret? The secret ballot was introduced to protect individual voters from coercion and manipulation, and to prevent vote selling. Remote voting, in which oversight by election officials is absent, and where it cannot be assumed that voters will be free from intimidation or observation, removes these protections. Thus there are concerns (Oostveen & van den Besselaar, 2004, p. 6) that "with remote voting…family members, colleagues, or employers may try to influence the voter's decision…Internet voting is expected to substantially increase the scale of these problems."

For Jürgen Habermas elections and similar systems are the necessary but fallible "legal institutionalization of the general conditions of communication for a discursive formation of will" (1992, p. 450)—necessary because in practice we need some means to move from debate to action, fallible because of temporal and other constraints under which voting occurs. Systems put in place for holding elections should encourage the discursive, reflective formation of opinion by individuals, rather than an "unpolitical follower mentality" (Habermas, 1992, p. 450) where people act only for their own personal short-term preferences. In this context, processes that make voting more convenient for individuals, but which diminish the social, deliberative and discursive elements of the electoral process are doing both the voter and society a

disservice. Given the limited amount of discourse occurring under contemporary systems, as described by Barber, it is legitimate to ask whether electronic voting will actually have a significant negative impact in this regard. Consider the limited communication undertaken by political activists outside polling stations in many jurisdictions. Does this qualify as discourse that is no longer possible with remote voting, or is it purely ritual? Would Internet voting encourage voters to be more reflective, searching out information on candidates as they vote, or encourage them to view voting as no different from buying an item online? A further question, that of public access to source code for software used in electronic voting systems has also been raised, entangling the electoral system in debates over open source software, free software, and the privatization of core public services (Commission on Electronic Voting, 2004; Ó Baoill, 2004).

## USABILITY AND PARTICIPATION

The introduction of electronic voting has often been enthusiastically received by disability advocate groups, in part because such systems often include features that enable blind voters to cast their vote in private, without assistance from a third party—something that is not generally possible with older manual systems—and other features that improve the ability of voters with disabilities to participate in the electoral process. As a result of the newfound equality of access these systems provide, advocacy groups have also sometimes opposed the addition of VVAT functionality to DREs, as the paper record generally returns blind voters to requiring an intermediary to participate in the voting process. It should be noted that not all electronic voting systems include features that facilitate use by blind voters, something that can in turn lead disability advocacy groups to withhold support (Commission on Electronic Voting, 2004).

Others support electronic voting on the basis that it can reduce or eliminate the unintentional casting of invalid votes by individuals. In certain cases, however, public debate has highlighted dissatisfaction with systems that also disrupt the possibility of intentionally casting a blank or invalid vote (a "spoilt" vote). In Ireland, debate on the planned introduction of a DRE system led to public outcry at the seeming removal of the ability to cast a spoilt vote (Commission on Electronic Voting, 2004; Ó Baoill, 2004). It is accepted that most spoilt votes result from inadvertent error. However, the debate in Ireland resurrected attention (Ó Baoill, 2004) to a "case [in which] a puppet character is reputed to have "secured" more ballot papers in Tallaght (a large suburb of Dublin) than one of the three candidates during the national Presidential election in 1990" something viewed as indicative of social discontent in that area. Can an intentional "spoilt" vote be a valid social statement? Debates such as this show that voters and "pollsters"—those "in charge of collecting and elaborating the poll results, or…otherwise involved in voting systems and processes"—often "have different expectations of how a polling system should perform" (Oostveen & van den Besselaar, 2004, p. 7). This highlights the importance of research such as that of Oostveen and van den Besselaar, where voters are asked to articulate what they believe to be the important issues arising from electronic voting.

The issue of computer proficiency also arises, with some professing concern that "the voter population will include people with little or no computer experience" (Larsen, 1999, p. 57). Given the heterogeneous target user group—comprising all those eligible to vote–any existing "digital divide" across race, gender, or other, lines offers potential for a distortion of participation rates and subsequent results (Oostveen & van den Besselaar, 2004). Some proponents hope to mitigate any negative impact of this through the use of multi-channel delivery with remote voting possible through mobile phones, digital television, and other interfaces, while maintaining the option of voting in a polling station for "the foreseeable future" (Pratchett, 2002). The Indian DRE system is frequently cited (Commission on Electronic Voting, 2004, p. 316; Gill, 2001) as being successful despite large numbers of voters who are illiterate or have little or no computing experience, though some argue (Mercuri & Camp, 2004) that the system "made it easier for partisan operatives to commandeer and control entire polling booths." Mercuri addresses some specific issues that arise in the case of remote Internet voting:

> *Off-site Internet voting creates unresolvable problems with authentication, leading to possible loss of voter privacy, vote-selling, and coercion. Furthermore, this form of voting does not provide equal access for convenient balloting by all citizens, especially the poor, those in rural areas not well served by Internet service providers, the elderly, and certain disabled populations. For these reasons, off-site Internet voting systems should not be used for any government election.* (Mercuri, 2001)

To approach the issue another way, and using the case of one vulnerable social group for whom electronic voting might have an impact—those with learning disabilities–careful design may, for example, reduce the risk of inadvertently spoilt ballots, a tangible benefit, though electronic voting cannot be expected to be a cure-all (Bell, McKay, & Phillips, 2001) since barriers to voting for this group go beyond what might be addressed by

electronic voting. In addition, *remote* voting might facilitate voting by this group, but would also remove the protection from coercion that a polling station provides.

It is important also to ask whether it is possible to examine usability divorced from more general societal questions of equity and cultural diversity. To the extent that usability can be usefully addressed, we must also ask what the practical impact of improved usability might be. Some governments, for instance, have seen electronic voting and remote voting as means to address falling participation rates (DETR, 1998, Wilson, 1999). However there are conflicting reports regarding the impact of such approaches, from estimations of "relatively insignificant" impact (Mercuri, 2002) to "indications [of] higher voter participation" (Chen et al., 2002). Done (2002) examines a 2000 presidential preference election in Arizona in which remote Internet voting was available and finds a significantly higher rate of participation than the previous (1996) election. The increase in remote paper voting was, however, almost as much as the number who used remote Internet voting and Done acknowledges that the increase resulted from a "combination of outreach, legal argument, process, and technology" (2002, p. 8). Overall the research available indicates that "e-voting on its own is unlikely to stimulate greater levels of democratic engagement" (Pratchett, 2002, p. 8) with at least one study finding postal ballots to have a significantly greater impact than remote Internet voting (Norris, 2003). Also significant—particularly in light of our earlier discussion of the social ritual conception of elections—is the claim (Internet Policy Institute, 2001, p. 24) that "previous reforms designed to make voting more convenient … have had very little if any impact on turnout levels and virtually none on the composition of the electorate."

While convenience and increased usability can benefit specific user groups such as the blind or those with learning difficulties as discussed above, they do not appear to have an impact on general issues of voter engagement and involvement. Hoffman asks whether the increased convenience of Internet voting would "outweigh the possible further erosion of the "civic ritual" of physically casting your vote at your local polling place" (2000, p. 221), bringing us back to our earlier discussion of the public nature of voting and forcing us to consider how to balance benefits for particular groups against losses for the overall population.

It has also been suggested that remote voting might have an impact on voter behavior other than merely on participation rates (Oostveen & van den Besselaar, 2003), and some work has been done on tools to measure this impact (Hammer & Traugott, 2004). Internet voting could have a significant impact; Hoffman (2000), for instance, draws attention to the "disintermediating" function of the Internet, which could effectively erase the current delay between receiving information and acting on it by voting. While some have seen benefits for, for instance, smaller political parties, in integrating an information portal or "lobby space" into a remote voting interface (Chen et al., 2002), Hoffman clearly worries that such developments might reduce reflection, inducing more knee-jerk reactions, and endangering both the deliberative and representative nature of current democratic systems. One's personal approach to these questions must inevitably be informed by one's own conception of the role and function of democracy (Barber, 1984). However, researchers such as Norris show (2003) that acceptance of the benefits of the Internet for the campaign process need not require that one support the use of computers or the Internet in the voting process.

## FUTURE TRENDS

The theoretical questions that have been raised, and the evidence to date, suggest that there is plenty of room for fruitful debates in this area. More research is needed on the impact on turnout of various innovations—including changes in technology and changes in the location of voting (kiosk voting, remote voting). Such research should attempt to identify the relative contribution of different factors—distinguishing, for example, the impact of remote voting in general from that of Internet voting—and be awake to the various demographic components that may further influence (changes in) participation rates. Given the attention paid to the purported ease of use of DREs and Internet voting there is also space for comparative, systematic research on the relative usability of various systems (Caltech/MIT Voting Technology Project, 2001, p. 72), which will, of course, depend in turn on factors such as the electoral system in use and cultural and social settings.

Further, there have been calls (Hammer & Traugott, 2004) for researchers to identify impacts other than simply the "top line" one of participation. Does electronic voting have an impact on voter behavior—such as participation in "second tier" ballots? What impact might changed usability for vulnerable groups—either improved, for the blind, or declining, in the case of the computer illiterate—have not only on results, but also on the electoral process and the greater political environment? What impacts do DREs and remote Internet voting systems have on the potential for discourse in and around the voting process–what opportunities are gained, what lost? The unique role of elections also suggests that this area would provide particularly interesting material for examinations of free and open-source software—with issues of privatization, commercialization, intellectual property, security of a

crucial application, and expertization all arising in this single case.

## CONCLUSION

The political momentum behind the introduction of electronic voting has often been strong, often driven by a sense that existing systems are anachronistic and inappropriate for our current society, or by a belief that electronic voting will provide an improved usability that will combat apathy and declining participation rates. Social research in the area would indicate that, as Norris notes, "technological quick fixes, while superficially attractive, cannot solve long-term and deep-rooted civic ills" (2003, p. 10). Rather, we should ensure that changes to these important systems are made in light of a holistic consideration of social and cultural effects.

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## KEY TERMS

**Electronic Voting System:** A voting system in which voters record their votes by means of an electronic interface, or DRE.

**DRE (Direct Recording Electronic Voting) Device:** A piece of equipment that allows voters to record their vote directly into electronic form. It can thus be differentiated from systems in which voters record their votes in, for example, paper form, with the votes later being collated and counted using an electronic system.

**Kiosk Voting:** The concept that voting might be possible in public places that would not have the trappings of a full traditional polling station. This is often thought of as being enabled by Internet voting, and might supplement, or be a transitional step to, remote Internet-enabled voting.

**Remote Internet-Enabled Voting:** Remote voting system in which the voter casts their vote on an Internet-enabled computer, which in turn transmits the vote over the Internet to a central server. Such a system might use a secure website or a specialized software application on the voter's computer.

**Remote Voting:** The situation where a voter need not attend a special venue, such as a polling station, in order to vote. Examples include postal ballots, remote Internet-enabled voting, and voting using alternative channels such as mobile phone messaging services.

**Voter Verified Audit Trail (VVAT):** A generally paper-based system run parallel to an electronic voting system that provides an independent record of the votes cast. One such system would involve a paper ballot being printed after the voter casts a ballot on the electronic system, allowing the voter to accept (verify) or reject that paper record.

# Social Issues of Trust and Digital Government

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## INTRODUCTION

Building any online system or service that people will trust is a significant challenge. For example, consumers sometimes avoid e-commerce services over fears about their security and privacy. As a result, much research has been done to determine factors that affect users' trust of e-commerce services (e.g., Egger, 2001; Friedman, Khan, & Howe, 2000; Riegelsberger & Sasse, 2001). Building trustable e-government services, however, presents a significantly greater challenge than e-commerce services for a number of reasons. First, government services are often covered by privacy protection legislation that may not apply to commercial services, so they will be subject to a higher level of scrutiny. Second, the nature of the information involved in an e-government transaction may be more sensitive than the information involved in a commercial transaction (Adams, 1999). Third, the nature of the information receiver is different in an e-government context (Adams, 1999). Some personal information, such as supermarket spending habits, might be relatively benign in an e-commerce situation, such as a loyalty program (supermarket points, or Air Miles, for instance), but other information such as medical records would be considered very sensitive if shared amongst all government agencies. Fourth, the consequences of a breach of privacy may be much larger in an e-government context, where, for example, premature release of economic data might have a profound effect on stock markets, affecting millions of investors (National Research Council, 2002).

E-government services also involve significant privacy and security challenges because the traditional trade-offs of risks and costs cannot be applied as they can in business. In business contexts it is usually impossible to reduce the risks, for example of unauthorized access to information, or loss of or corruption of personal information, to zero and managers often have to trade-off acceptable risks against increasing costs. In the e-government context, because of the nature of the information and the high publicity, no violations of security or privacy can be considered acceptable (National Research Council, 2002). Although zero risk may be impossible to achieve, it is vital to target this ideal in an e-government service. In addition, government departments are often the major source of materials used to identify and authenticate individuals. Identification documents such as driver's licenses and passports are issued by government agencies, so any breach in the security of these agencies can lead to significant problems. Identity theft is a growing problem worldwide, and e-government services that issue identification documents must be especially vigilant to protect against identity theft (National Research Council, 2002). Another significant challenge for e-government systems is protecting the privacy of individuals who traditionally have maintained multiple identities when interacting with the government (National Research Council, 2002). Today, a driver's license is used when operating an automobile, a tax account number is used during financial transactions, while a government health card is used when seeking health services. With the implementation and use of e-government services it becomes possible to match these separate identities in a manner that was not being done before, and this could lead to new privacy concerns.

## BACKGROUND

Trust is a cognitive process and behavior that people use every day to make decisions, reassure themselves, judge information, confer authority, take or assign responsibility under uncertainty, and simply to get out of bed in the morning (Luhmann, 1979). It's one of the building blocks of society (Bok, 1978; Misztal, 1996) and it is necessary for effective day-to-day cooperation. It is worth noting that the decline (or otherwise) of public trust in government is not necessarily universal, and is a phenomenon worth much further study. That said, trust in some governments has been studied extensively, particularly with regards to

the decline of trust in public institutions (for example, see Thomas, 1998; Uslaner, 2001), as well as the apparent increase in trust in government in the U.S. post-September 11th (Chanley, 2002). As well, the link between political and social trust has been extensively studied (see for example, Newton, 2001).

Recently, as evidenced by this volume, there has been an upsurge in bringing government closer to the people by making services, ideas, decision makers, and procedures available to people using information and communication technologies (ICTs). One of the laudable ideals of this work is that, by increasing citizen participation in government, the crisis of confidence (trust) can be answered and to some extent reversed. That is, if citizens have more of a say in running their country than an election every few years, they will feel more connected with government, and thus trust it more (e.g., Advisory Committee to the Congressional Internet Caucus, 2001). Trust is a multidimensional concept and addressing it completely would result in a book on its own. Here we will introduce trust issues in digital government by briefly defining what trust actually is, both in terms of social trust and trust in the digital sphere, then what digital government projects can do that address trust issues, pointing out some of the pitfalls and problems associated with the work.

## DEFINING TRUST

Trust, although not always a mainstream research topic (Misztal, 1996), has in recent years become much more fashionable. Ironically, this is in large part due to the influence of the online world, where in the late 1990's the Internet boom resulted in a need to understand how trust worked in online situations, so that people would ultimately spend more money (for excellent examples of studies in this area, see Cheskin, 1999, 2000). Fortunately, the later dot-com bust did not significantly reduce this need to understand trust, and developments in the area have led to better experiences for people using Web systems, better designed interfaces, and an increased level of sophistication of both information providers and information users.

While there is an *interest* in trust, there remain almost as many definitions as there are researchers in the area. It may not be necessary to have a precise definition if we can agree that trust exists (Bok, 1978; Misztal, 1996). Nevertheless, we have developed an operational definition of trust that is very useful (Marsh & Dibben, 2003, p. 470): "Trust concerns a positive expectation regarding the behavior of somebody or something in a situation that entails risk to the trusting party."

*Table 1. The layers of trust*

| Trust Layer | Description |
|---|---|
| Dispositional (Basic) | The basic disposition of a person to be trusting or not (and how trusting) |
| Learned (General) | A person's general tendency to trust, or not to trust, as a result of experience. Based on dispositional trust |
| Situational (Contextual) | A person's trusting judgment in a specific context or situation, based on dispositional and learned trust |

The important points are that there is a judgment involved, as positive expectation, that there is free will on both sides to behave in certain ways, and that there is an element of risk.

Our work has also led us to describe trust as a *layered* phenomenon (Marsh, 1994; Marsh & Dibben, 2003). The different layers of trust (see Table 1) are utilized in different ways and together determine how trust will be used in particular situations. For example, in an unfamiliar situation, dispositional trust is of the greatest importance because no experiences are available to the trustor. In a familiar situation, people can rely on past experiences to make a learned judgment. And in a specific situation encountered before, trustors can make situational decisions that are specific to the context. Clearly, the more information available the better, although ironically, complete information by definition removes the need to rely on trust.

In the digital world, trust is both the same as it is in traditional face-to-face interactions, and it is different. Whereas people may be quite adept at assessing the likely behavior of other people and the risks involved in the physical, face-to-face world, they may be less skilled when making judgments in online environments. For example, people may be too trusting online, perhaps routinely downloading software or having conversations in chat rooms without realizing the true behaviors of the other parties and the risks involved. People may also have too little trust in online situations, perhaps dogmatically avoiding e-commerce or e-government transactions in the belief that such actions cannot be done securely, at the cost of missed opportunities and added inconvenience. As with any new thing, there is a process of building knowledge and awareness, and it is the responsibility of governments to make sure that its digital persona is trustable and to a large extent inviolable from a security point of view.

## CHALLENGES

There are several trust challenges that must be addressed when designing and implementing interactions and tech-

nologies for digital government. As has already been noted, the level of trust that people have in the Internet and online technologies can be scarce and fragile. While digital government may have an advantage over other online services because of the mandatory nature of some digital government interactions, such as filing taxes (Warkentin, Gefen, Pavlou, & Rose, 2002), it still faces significant challenges. The following list summarizes some of the challenges and opportunities for digital government projects that are related to the nature and presence of trust.

## Understanding

There remains a lack of understanding of trust in the digital sphere, a lack of appreciation of the needs of e-government within government (it's not just a Web site), and a corresponding lack of understanding of the needs of government in the developers of digital government services. Huge strides have been made recently to overcome these hurdles, but a key recommendation in any digital government endeavor is to *fully understand the needs of all parties and fully appreciate potential goals and outcomes* (Fang, 2002; Marchionini & Levi, 2003; Pardo, 200l; Schorr & Stalfo, 1998; Warkentin et al., 2002).

## Responsibility

Increasing the responsibility of the citizen for taking part in the democratic and governmental process is potentially a very good way of enhancing their trust in that process. Government, however, has added responsibilities of its own, including timeliness, enhanced clarity, and efficiency in delivery. Thus, a key recommendation in this respect is to *make clear beforehand what is expected in any transaction or a continuing set of transactions by each party of the other* (Fang, 2002; van Gompel & Steyaert, 2002).

## Expectations

More than anything else, it is important that the expectations of citizens be managed and treated with care. Putting government services online does *not* necessarily mean citizens can video-conference with their representatives, but often, you'd be led to think so with the fanfare that surrounds government online services. As well, the younger citizens, those to whom such technologies can be more accessible, have their own expectations of performance and availability. What is key here is to *realize, communicate accurately and live up to the performance and behavior that is expected, and manage external expectations accordingly* (Allen, Juillt, Paquet, & Roy, 2001; Schorr & Stalfo, 1998).

## The Digital Divide

Not everyone owns a computer, and fewer have fast Internet access. This lack of access, through lack of availability or resources, is the quintessential digital divide. Thus, *it is unreasonable to assume everyone will be able to access digital services through a computer in the home or library*—there remains a danger that some citizens will become increasingly disenfranchised. Thus, digital government is not a 100% solution (Institute for Social Research, 2002; van Gompel & Steyaert, 2002).

## Security

The Internet is not always the safest place. Viruses, spam, spyware, and phishing are some of the many security risks to online citizens. Any and all of these have a direct and tangible effect on trust. As an example, consider the following: a citizen checks her e-mail and has a message from the government requesting that she confirm your tax details. She follows the link and goes online to file her taxes, fills in the necessary fields, including identification number, address, pension details, and so on, and submits the form. But the site is a fake and her details, her personal identity, is now lost. The effect on trust could be massive, and just because it's not the government's fault won't make it any better. The utmost care is needed to manage this trust so that citizens are protected, and feel protected. Part of this is in the communications, thus, *citizens should be kept informed, up to date and aware of their rights, responsibilities, and risks when interacting online with a government, and governments should manage (and be seen to manage) their online security with the utmost care* (Joshi, Ghafoor, Aref, & Spafford, 2001; Medjahed, Rezgui, Bouguettaya, & Ouzzani, 2003; Rezgui, Ouzzani, Bouguettaya, & Medjahed, 2002).

## Delivery Methods: Accessibility and Design

Some citizens have skipped the computer altogether and now use mobile PDAs and cell phones. Still others have fundamental interaction challenges such as blindness. These differences of accessibility are important and *trust can be built by providing for and opening services digitally to the differently abled.* Avoiding fancy interaction techniques that can get in the way of assistive technologies is mandated here. The final concern, while not so much a divide, is the capability of the device being used, which may well be the citizen's only access to digital government—screen size, memory, interaction means, and so on, are all important here. Thus, it is

imperative that *digital government technologies fully grasp and accommodate the differing means of accessing them* (Marchionini & Levi, 2003).

## SOLUTIONS

The issue of building trust has most often been studied for e-commerce transactions (e.g., Rielgelsberger & Sasse, 2001) but the lessons are also applicable to e-government. One of the most important factors for building trust in e-commerce is the visual design of the interface, and users often make rapid trust decisions based on a shallow analysis of the appearance of a Web site (Fogg, Marable, Stanford, & Tauber, 2002). A visual appearance that is clean, uses pleasing colors and graphics, is symmetrical (that is, balanced in appearance), and is professional looking is usually rated as more trustable. Other design factors that can build trust are the amount of information provided to the user, such as the information on how a system operates and the status of any processing. This transparency of operations can be particularly important for e-government systems because users may not understand the internal procedures and policies that are involved in a government service. Predictable performance can also be an important factor, with systems that respond rapidly and consistently instilling higher levels of trust.

The most important factors for determining the level of perceived risk in e-government transactions are the sensitivity of the information involved and the receiver of the information. As previously discussed, users will perceive situations to be more or less risky depending on the nature of the personal information that is involved and the eventual destination.

Halabi (2002) has recently summarized some simple design principles for e-government interfaces. The most important is usability, which is the ability to perform the necessary tasks with ease. If users cannot accomplish the tasks they set out to perform, the service will not be accepted or used. There are a number of usability test methods that can be used to assess problems in this area, and human factors researchers have developed a number of user-centered design techniques that can improve usability (e.g., Nielsen, 1993). Kossak, Essmayr, Winiwarter (2001) have illustrated how these techniques can be applied to e-government services.

The second factor is providing transparency through comprehensive information. For example, if an e-government service for paying parking tickets does not provide detailed information about how quickly the payments are processed, users may not trust it in fear that they will incur further penalties. A related factor is feedback and reassurance. The interface should ensure that users receive acknowledgement when information is received, and a capability to track the processing of requests or transactions will often reduce apprehension.

Another useful resource for building trustable e-government interfaces is the research results on Web site credibility. B. J. Fogg (2002) has summarized this research into a set of design guidelines that are very relevant to e-government services. Perhaps the most important is to make the site useful. This means providing the information and services that the users really want, rather than what the government wants to provide. In a sense, this can be thought of as government adopting something of a business model in its online provisions. A related principle is to make it usable, as was discussed above. A second principle is that the service should clearly identify itself as a legitimate organization, which means using the appropriate government logos and appearance. Third, the interface should show the real people behind the site, rather than providing a faceless corporate look. Although showing the names and faces of individuals may not be possible in a large government bureaucracy, putting some kind of human face on the interface will be important for building trust. A related design guideline is to make it easy to contact the service organization (e.g., by telephone or e-mail), and this is related to the flexible access design goal discussed above. Fogg's research also supports the importance of a professional look and feel, which includes layout, typography, colors, images, and consistency. The most colorful design is not always the most appropriate and it is important to match the visual design to the site's purpose. It is also important to avoid errors, including typographical errors and missing links. Even the smallest errors can decrease the credibility of a site. Finally, providing up-to-date and dynamic information that is clearly time-stamped is important for building trust and return visitors.

## FUTURE TRENDS

Not all is challenge, however. The opportunities provided by digital government are many, and this volume brings them to light. One of the interesting things about trust is that, once it is present, it can be leveraged in different directions. For example, once citizens trust the government with their information in one way, there may be a place for government to attempt to use the trust in other forms. Consider early warning systems for natural disasters—if government knew who of their citizens was in a threatened area, and had details as to how to contact them (exit scans of passports, cell phone/text messaging details, and so on), such systems could be enabled and save lives. However, the lack of trust that exists in government

today precludes such tools because citizens are not comfortable with the thought of their information being manipulated in this way. (It's worth pointing out here that privacy laws in various countries are not an indication that citizens trust their governments and industries, rather the opposite.) Trust can be won, and once won, leveraged, but it will take time. Digital government provides decision makers with excellent tools for building trust, such as accessible online interactions, timely information provision, and well thought-out service provision.

## CONCLUSION

Trust is a basic building block of human societies, and a scarce resource that must be nurtured and built over time. Trust will be crucial for the success of any e-government enterprise. But trust is also a resource that governments have less of now than ever before. Digital government, the provision of services and new modes of interaction by government for citizens, presents an opportunity to win back trust simply by increasing participation and familiarity with government. But if people do not trust a service, they will not use it. Worse, if they use it and are let down, they will be extremely hard to win back. Getting it right the first time is vitally important because second chances are scarce and costly.

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## KEY TERMS

**Digital Divide:** The situation whereby those able to afford computers and associated equipment can have better services or experiences than those without.

**Human-Computer Interaction:** The study of how computer user interfaces can be designed to better accommodate (real) people.

**Identity Theft:** Where a person's personal details are gathered so as to enable another to impersonate them. Often achieved through non-technical means such as dumpster diving, but susceptible to phishing and other hack attacks such as spyware.

**Phishing:** Impersonation of a Website (usually an e-commerce site) with the purpose of stealing personal information (bank details, passwords, etc.) and then using them for fraudulent purposes.

**Security:** In computational terms, making computers and networks capable of withstanding attacks from within or outside.

**Spyware:** Small malicious programs downloaded onto personal computers that watch activities such as keystrokes and send details to others to allow fraudulent use (i.e., passwords).

# Strategic Importance of Security Standards

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## INTRODUCTION

### E-Security and E-Privacy Issues

Even before September 11, 2001, security and privacy was a concern to nearly 80% of the current and potential Internet users around the globe, according to survey released by the Information Technology Association of America (ITAA) (Poulsen, 2000). The survey, commissioned by the American Express Company, randomly polled 11,410 people in 10 countries, and found that nearly half of the respondents enjoyed some form of Internet access. As might be expected, most of the world's Internet users utilize Internet for e-mail, browsing, and entertainment. However, fewer than 28% do some shopping online, and 24% use the Internet for banking and financial transactions. But when Internet users and nonusers of many countries were asked if they agree with the statement, "I am or would be concerned about security and privacy issues when purchasing or making financial transactions online," 79% agreed. Prior to the tragedy of September 11, 2001, U.S. citizens also expressed legitimate concerns toward the issues of privacy and security, with an 85% showing. The poll released by the Information Technology Association of America also illustrated that approximately 80% have doubts about the U.S. government's ability to maintain computer security and privacy. Hence, protecting operating systems is a major strategic concern if the success of e-government as a whole is to reach its potential. Although most of these issues are typically not discussed in relationship with e-government, the need for trusted computing systems within e-business and computing systems can be made as an effective argument that all these issues affect e-government systems as well. Secure computing systems issues in terms of e-government are just as important.

The scope of this article is to present a description of one the most generally known security certifications; namely, the trusted computer system evaluation (TCSEC) and its commercial implementation procedure in the commercial product evaluation process and discuss the influence of this evaluation/certification on the incidence of hacker attacks on e-business. As evident by the abundance of marketing literature of different operating systems for e-business that frequently refers to its security strength ranked against popular security certifications, it is very common to rank commercially available operating systems against TCSEC evaluation and/or certification criteria. This article will also explore where the many operating systems stands on this particular evaluation. In essence, given the vulnerabilities exposed after September 11, 2001, strategic security managers should be deeply concerned that the e-business platform they are responsible for contains the highest security standards to prevent any type of potentially harmful hacker attacks. Managers need to have a working knowledge of TCSEC security evaluation/certifications to become better informed when choosing the e-security platform for e-government/e-business.

Essentially, the selection of a particular operating system for e-government/e-business have as much to do with factors ranging from existing skills, existing infrastructure, and economic reasons all the way up to political and strategic reasons. In dealing strategically with modern e-business environments, one of the most important factors that management must consider when choosing an operating system for their e-business platform is the security strength to resist computer hacker attacks on the operating system. If, for example, during different hacker attacks, one of the major aspects of these attacks is a certain operating system, as opposed to other systems, then this is a clear message to management to build in proper safeguards in the proposed operating system (Smith & Rupp, 2002a, 2002b). Certainly some of the reasons for frequent hacker attacks may probabilistic in terms and not random events, since Linux and Windows operating systems are more frequently used for e-commerce than other systems. So, it is not surprising that there are practically few reports of successful hacker attacks against operating systems that run e-business platforms (Smith, 2005; Smith & Lias, 2005; Smith & Offodile, 2002).

### Strategic Imperative for Proper IT Management Practices

#### Renewed Focus on Security in the E-government Environment

According to Dunn (2001), computer crime incidents more than doubled in a single year, creating a virtual crime wave

across computer systems all over the world. For example, more than 21,000 incidents, up from nearly 10,000 in 1999, were reported in 2000 to Carnegie Mellon University's Software Engineering Institute—which tracks online criminal activity in the United States and provides assistance and advise to victims (CERT/CC statistics 1988-2001, 2001) (This is 5 years old, get the most recent data from the same site.). For example, in the first quarter, record numbers of more than 7000 incidents of cyber crime were posted. As of total incidents reported (1988-Q3 through 2001) has climbed to a record high of 82,465 (CERT/CC statistics 1988-2001, 2001) (Rewrite). The Internet Fraud Complaint Center (IFCC)–which was initially established by the FBI and the National White Collar Crime Center in May 2000, reported increasing amounts of Internet fraud as well (The Internet Fraud Complaint Center (IFCC), 2001). IFCC offers a central repository for complaints related to Internet fraud, works to quantify fraud patterns, and provides timely statistical data of current fraud trends. The Internet Fraud Complaint Center has reported a total of more than 20,000 complaints from its inception until early November 2000 (The Internet Fraud Complaint Center (IFCC), 2001) (Old data). Unfortunately, in addition to fraudulent transactions, cyber crime ranges from hacking to stealing credit card numbers and planting viruses (Dunn, 2001). The apparent need for strategic management information systems and its proper management to combat these recent and significant increases in cyber crime should be of high priority in the minds of e-government administrators.

Considering that humans cannot be in more than one place at a time, the need for software agents and its document security is on the rise. In order to conduct profitable transactions in the increasing number of electronic marketplaces, an individual user needs to keep tack of the ever-changing offer, demand, and price situations in a secure environment. An encouraging new way of fulfilling this strategy is with the use software agents that represent their human principals at the marketplace, having these agents conduct a whole business transaction in a satisfying way.

A software agent is a computer program which functions continuously and autonomously in an environment in which other processes take place, and other agents exist. In today's environment, agents are known as shopbots, but they are most widely used for information retrieval, while negotiations are not supported. If there is a market world existing without a centralized institution and a common goal, agents will be free to act fraudulently, or cheat in negotiation. In order to reduce the risks related to financial loss in the marketplace due to a fraudulent agent, a mechanism is needed to obtain earlier information concerning the agents' previous transactions- his reputation. The reputation of the agent can be described as good or bad based on the amount of document sharing and former transaction partners apply the rating. A good reputation means that the agent has kept commitments, and an agent having a bad reputation is expected to behave non-cooperatively, or not keep commitments.

The main aspects of a sound security framework, if open to all software agents would be: Authentication, privacy, and non-cooperation. In the occurrence of the authentication issue, the human owner of the agent may choose to mask their identity. In addition, the same person can utilize several different pseudonyms, which in turn may lead to the phantom bidder. Access to change pseudonyms frequently should be unavailable; thus allowing future partners a chance to gain reputation information. The privacy issue is the second area of concern in insecure networks like the Internet, even though confidential communications are subject to prior authentication. Lastly, software agents involved in the marketplace are free to behave in a non-cooperative way.

In order to limit the ability of agents to act irresponsibly, a prototype system called Avalanche was developed, implementing a private key that will digitally encrypt agent messages (Bagner, Evansburg, Watson, & Welch, 2003; Chen, Chen, Lin, 2003; Kang & Han, 2003). The developers believe that this will knock down the barriers that exist for new Internet-based business cooperation. With the help of Avalanche, the development of fast, flexible, and adaptive markets will extend beyond static catalog Web sites and closed auction communities, where transactions amongst unknown agents can create new market opportunities.

In order to take advantage of these new market opportunities, there are numerous research efforts suggesting the need for effective management practices for IT infrastructure and its successful applications. In particular, Ross, Beath, and Goodhue (1996) researched the objectives for successful strategic IT management practice and found the following practices: (1) Bottom aligning IT products and services with the firm's strategic objectives, (2) Delivering solutions faster, and (3) Providing high-quality, cost-effective measures. Ross, Beath, and Goodhue (1996) also found that the process of segregating support costs for non-standard technologies promoted IT-business unit communication that aided in the identification of outdated standards and established priorities for new standards (p. 34). They discovered that shared risk and responsibility are built on this shared communication and mutual respect through the interaction of people and associated IT assets.

In addition, Kossek and Ozeki (1998), make the insightful observation that "The need to develop a global perspective on human resource management has been part of the managerial landscape for well over a decade, but there is no consensus about what tools to use" (p. 2). Kossek

and Ozeki found through their research that there are at least three challenges facing global managers: (1) Deployment, (2) Knowledge and information dissemination, and (3) Identifying and developing talent on a global basis. These important relationship assets include business partner ownership of and accountability for all IT projects, as well as top management leadership in establishing IT priorities. These relationships, especially concerning types of automatic identification and data capture systems assets; also interact with both the human elements and the technology assets to form the IT-assets model proposed by Ross, Beath, and Goodhue (1996). Although these assets are distinct, they are mutually reinforcing. Although not every firm will choose to make IT a strategic asset and provide the proper level of protection, even though every firm that finds itself information-dependent will encounter situations in which competitors develop IT applications that become competitive necessities. IT applications that become competitive necessities are further demonstrated by research by Evans and Wurster (1997). Evans and Wurster have suggested that since current availability of large quantities of information has changed operating processes, company executives are being forced to re-think the strategic fundamentals of their businesses and their methods of competing in the marketplace.

Firms not directly involved in disseminating information through a product line are also directly involved with the economics of information, such as capturing, storing and processing information relative to their business during the process of designing, producing, marketing, delivering and supporting their products. In the process of disseminating this information to achieve strategic goals, as suggested by Evans and Wurster (1997), there is a trade-off between richness and reach. "Reach simply means the number of people, at home or at work, exchanging information" (p.73). Richness is defined in three ways relative to the aspects of the information: (1) bandwidth or the amount of information that can be moved from sender to receiver in a given time; (2) customization or the degree to which the information can be customized; (3) interactivity or that dialogue is possible for a small group, but to reach millions the message must be a monologue. The traditional belief in a corporation is that communication cannot be rich and broad simultaneously. However, the rapid advancements in net technologies now allow everybody to communicate with everybody else. "The explosion in the number of people and organizations connected by networks" is "freeing information from the channels that have been required to exchange it, making those channels unnecessary or uneconomical" (p. 74).

This change in economics of information can be responsible for deconstruction of the value chain, requiring firms to fundamentally re-think their strategy. For example, newspapers are built on a vertically integrated value chain and are ripe for upheaval. "Journalists and advertisers supply copy, editors lay it out, presses create the physical product, and an elaborate system delivers it to readers each morning" (p. 75-76). Anyone with a computer can access the latest news from many sources at anytime without the need to purchase a daily newspaper. Through the use of a computer it is also possible to submit, pay for, update, search through, and respond to advertisements electronically and conduct e-governmental services. This deconstruction will require new brand strategies and that "new branding opportunities will emerge for third parties that neither produce a product nor deliver a primary service" (p. 81). They suggest that "assets that traditionally offered competitive advantages and served as barriers to entry will become liabilities" (p. 82), and that it will be very difficult for managers to act on these implications.

## NEED FOR SECURITY IN E-GOVERNMENT

### National Computer Security Center (NCSC)

The National Computer Security Center (NCSC) is entirely a subsidiary of the National Security Agency (NSA) of the U.S. government. This organization is essentially in charge of dictating guidelines for computer security at a very high level. The NCSC generally publish security guidelines in several books (rainbow series) and regularly updates them on a continuous basis. A major focus at the Computer Security Resource Center (CSRC) is on working with government and industry to establish more secure systems and networks by developing, managing and promoting security assessment tools, techniques, services, and supporting programs for testing, evaluation and validation. The CSRC addresses such areas as: development and maintenance of security metrics, security evaluation criteria and evaluation methodologies, tests and test methods; security-specific criteria for laboratory accreditation; guidance on the use of evaluated and tested products; research to address assurance methods and system-wide security and assessment methodologies; security protocol validation activities; and appropriate coordination with assessment-related activities of voluntary industry standards bodies and other assessment regimes (Security Testing, 2001). Prominent among these publications are the Orange book, which deals with security systems in stand-alone operating system, and the Red book, which deals extensively in networking. In dealing with e-business platforms, even

that the red book for networked computers is the basis of the Internet, the Orange book that deals with the server provides the basis security infrastructure where the e-business site actually runs.

Recently three significant events have increased the security importance of U.S. standards like the TCSEC. The first and obvious one is that on the exponential explosion of e-government. The other is the permission from the U.S. government to export SSL encryption technology to almost all countries allowing secure connection around the globe putting increasing security focus on the server side of the e-business in a global scale. The third, and most profound, is the national and international consensus on the need for security safeguards in the wake of the tragic September 11, 2001 event.

Therefore, trust is a key component of eBusiness and all online users should be able to evaluate the reputation and the trustworthiness of Web sites that they initiate transactions with. Trust transcends separate technological and business aspects. Authentication, e-security, and users' authorization are chiefly technological and are the key areas where electronic signatures and trustworthiness is established. Such factors as reputation, e-privacy, reverse logistic, customer support, and service all directly effect business transactions.

A trusted third party is necessary in establishing the identities and standards of the verification system. Many firms take advantage of public key infrastructure where a person's public key could be accredited or verified by other users or companies. This works as long as all the users have integrity. Standards should be used for electronic signatures, preferably one that is open source and is the result of one vendor succeeding in competition over or combining with several others, or a set of common keys between various systems will enable e-businesses to have a verification "Rosetta Stone" of bona fide verification and transactions. Although people trust reliability, excellence, urgency and kept promises, there must be sufficient safeguards build into the technologies so that people can trust them without verification through face-to-face interaction. Many customers routinely pay many of their bills at various vendor Web sites, from Sprint PCS to Duquesne Light, and do not worry about their transactions because of established reputations for trust reliability.

## Components of the Trusted Computer System Evaluation (TCSEC)

The trusted computer system evaluation criteria classify systems into four broad hierarchical divisions of enhanced security protection. They provide a basis for the evaluation of effectiveness of security controls built into automatic data processing system products (Department of Defense Standard, Department of Defense Trusted Computer System Evaluation Criteria, 2001; Hasselbring & Weigand, 2001). The criteria were developed with three objectives in mind:

a. To provide DoD (Department of Defense) components with a metric with which to evaluate the degree of trust that can be placed in computer systems for the secure processing of classified and other sensitive information
b. To provide guidance to manufacturers as to what to build into their new, widely-available trusted commercial products in order to satisfy trust requirements for sensitive applications
c. To provide a basis for specifying security requirements in acquisition specifications

With respect to the first purpose evaluations can be delineated into two types: An evaluation can be performed on a computer product from a perspective that excludes the application environment; or, it can be done to assess whether appropriate security measures have been taken to permit the system to be used operationally in a specific environment. The former type of evaluation is done by the Computer Security Center through the Commercial Product Evaluation Process that uses the trusted computer system evaluation criteria. The latter type of evaluation, those done for the purpose of assessing a system's security attributes with respect to a specific operational mission, is known as a certification evaluation. It must be understood that the completion of a formal product evaluation does not constitute certification or accreditation for the system to be used in any specific application environment. On the contrary, the evaluation report only provides a trusted computer system's evaluation rating along with supporting data describing the product system's strengths and weaknesses from a computer security point of view. The system security certification and the formal approval/accreditation procedure, done in accordance with the applicable policies of the issuing agencies, must still be followed-before a system can be approved for use in processing or handling classified information. Designated approving authorities (DAAs) remain ultimately responsible for specifying security of systems they accredit.

The trusted computer system evaluation criteria will be used directly and indirectly in the certification process. Along with applicable policy, it will be used directly as technical guidance for evaluation of the total system and for specifying system security and certification requirements for new acquisitions. Where a system being evaluated for certification employs a product that has undergone a commercial product evaluation, reports from that process will be used as input to the certification

evaluation. Technical data will be furnished to designers, evaluators and the designated approving authorities (DAA) to support their needs for making decisions.

The scope of these criteria is to be applied to the set of components comprising a trusted system, and is not necessarily to be applied to each system component individually. Hence, some components of a system may be completely un-trusted, while others may be individually evaluated to a lower or higher evaluation class than the trusted product considered as a whole system. Though the criteria are intended to be application-independent, the specific security feature requirements may have to be interpreted when applying the criteria to specific systems with their own functional requirements, applications or special environments—communications processors, process control computers, and embedded systems in general. The underlying assurance requirements can be applied across the entire spectrum of ADP system or application processing environments without special interpretation.

## Nomenclature of the Criteria

Concurrent with DoDs efforts to address computer security issues, work was begun under the leadership of the National Bureau of Standards (NBS) to define problems and solutions for building, evaluating, and auditing secure computer systems. The criteria are divided into four divisions: D, C, B, and A ordered in a hierarchical manner with the highest division (A)—reserved for systems providing the most comprehensive security (Department of Defense Standard, Department of Defense Trusted Computer System Evaluation Criteria—December 1985. 2001). Each division represents a major improvement in the overall confidence one can place in the system for the protection of sensitive information. Within divisions C and B there are a number of subdivisions known as classes. The classes are also ordered in a hierarchical manner with systems representative of division C and lower classes of division B being characterized by the set of computer security mechanisms that they possess. Assurance of correct and complete design and implementation for these systems is gained mostly through testing of the security- relevant portions of the system. The security-relevant portions of a system are referred to throughout this document as the Trusted Computing Base (TCB). Systems representative of higher classes in division B and division A derive their security attributes more from their design and implementation structure. Increased assurance that the required features are operative, correct, and tamperproof under all circumstances is gained through progressively more rigorous analysis during the design process.

Within each class, four major sets of criteria are addressed. The first three represent features necessary to satisfy the broad control objectives of: Security policy, accountability, assurance, and documentation—which describes the type of written evidence in the form of user guides, manuals, and the test and design documentation required for each class (Department of Defense Standard, Department of Defense Trusted Computer System Evaluation Criteria–December 1985, 2001).

## Requirements of Each Level

The classes of systems recognized under the trusted computer system evaluation criteria are as follows. They are presented in the order of increasing desirability from a computer-security point of view (Department of Defense Standard, Department of Defense Trusted Computer System Evaluation Criteria—December 1985, 2001).

1. **Class (D): Minimal Protection:** This class is reserved for those systems that have been evaluated but that fail to meet the requirements for a higher evaluation class
2. **Class (C1): Discretionary Security Protection:** The trusted computing base (TCB) of a class (C1) system nominally satisfies the discretionary security requirements by providing separation of users and data. It incorporates some form of credible controls capable of enforcing access limitations on an individual basis (i.e., ostensibly suitable for allowing users to be able to protect project or private information and to keep other users from accidentally reading or destroying their data). The class (C1) environment is expected to be one of cooperating users processing data at the same level(s) of sensitivity
3. **Class (C2): Controlled Access Protection:** Systems in this class enforce a more finely grained discretionary access control than (C1) systems, making users individually accountable for their actions through login procedures, auditing of security-relevant events, and resource isolation
4. **Class (B1): Labeled Security Protection:** Class (B1) systems require all the features required for class (C2). In addition, an informal statement of the security policy model, data labeling, and mandatory access control over named subjects and objects must be present. The capability must exist for accurately labeling exported information. Any flaws identified by testing must be removed. The key distinction between C-level and B-level security is in the notion of access control. For example, in a C2 (DAC) system, owners have absolute discretion about

whether or not others have access to their objects. In a B-level, or mandatory access control (MAC) system, objects have a security level defined independently from the owner's discretion. For example, if you receive a copy of an object marketed "secret," you cannot give permission to other users to see this object unless they have "secret" clearance. This is defined by the system independent of your discretion. MAC involves the concept of data labeling, which is the creation and maintenance by the system of security "labels" on data objects, unalterable by users (except in certain cases under system control and auditing). An administrator can get access to anyone's objects, although it may require some programming to do so, that is, the user interface would not expose this power.

5. **Class (B2): Structured Protection:** In class (B2) systems, the TCB is based on a clearly defined and documented formal security policy model that requires the discretionary and mandatory access control enforcement found in class (B1) systems be extended to all subjects and objects in the ADP system. In addition, covert channels are addressed. The TCB must be carefully structured into protection-critical and non-protection-critical elements. The TCB interface is well defined and the TCB design and implementation enable it to be subjected to more thorough testing and more complete review. Authentication mechanisms are strengthened, trusted facility management is provided in the form of support for system administrator and operator functions, and stringent configuration management controls are imposed. The system is relatively resistant to penetration.
6. **Class (B3): Security Domains:** The class (B3) TCB must satisfy the reference monitor requirements that it mediate all accesses of subjects to objects, be tamperproof, and be small enough to be subjected to analysis and tests. To this end, the TCB is structured to exclude code not essential to security policy enforcement, with significant system engineering during TCB design and implementation directed toward minimizing its complexity. A security administrator is supported, audit mechanisms are expanded to signal security-relevant events, and system recovery procedures are required. The system is highly resistant to penetration.
7. **Class (A1): Verified Design:** Systems in class (A1) are functionally equivalent to those in class (B3) in that no additional architectural features or policy requirements are added. The distinguishing feature of systems in this class is the analysis derived from formal design specification and verification techniques and the resulting high degree of assurance that the TCB is correctly implemented. This assurance is developmental in nature, starting with a formal model of the security policy and a formal top-level specification (FTLS) of the design. In keeping with the extensive design and development analysis of the TCB required of systems in class (A1), more stringent configuration management is required and procedures are established for securely distributing the system to sites. A system security administrator is typically supported.

## CONCLUSION

As evident from these classifications, it is important to understand strategically how IT applications and their security configurations are interconnected and become competitive necessities for successful e-government operations. Hence, current availability of large quantities of information has changed operating processes; company executives are being forced to re-think the strategic security fundamentals of their businesses and their methods of competing in the marketplace. The issue of e-privacy/e-security in an e-government environment is based on the tenets of building trust. Only through a persuasive discussion of privacy agreement on ethics can universally accepted standards can be implemented. By pitting the most fervent opposing issues, that the manager must protect itself and its resources against the employees' privacy rights and the fact that home life and work life are more greatly overlapping than ever before with customers, a compelling need to reach a balance or win-win situation with trusted systems. Hopefully, a discussion of the security-relevant portions of a system, the Trusted Computing Base (TCB), as they related to the widespread availability of trusted computer systems for use in e-government applications, will result in increased consumer confidence and loyalty. The never-ending quest for growth among businesses demands that trust evaluations and/or audits must be consistent and the benefits and detractors continually updated to allow a fair assessment of the e-government environment and of what is best for computer users.

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## KEY TERMS

**Computer Security Resource Center (CSRC):** Is working with government and industry to establish more secure systems and networks by developing, managing, and promoting security assessment tools, techniques, services, and supporting programs for testing, evaluation, and validation.

**Internet Fraud Complaint Center (IFCC):** Initially established by the FBI and the National White Collar Crime Center in May 2000, offers a central repository for complaints related to Internet fraud, works to quantify fraud patterns, and provides timely statistical data of current fraud trends.

**National Bureau of Standards (NBS):** A major U.S. government agency charged with defining problems and solutions for building, evaluating, and auditing secure computer systems.

**National Computer Security Center (NCSC):** A subsidiary of the National Security Agency (NSA) of the U.S. government and is in charge of dictating guidelines for computer security at a very high level. The NCSC generally publish security guidelines in several books (rainbow series) and regularly updates them on a continuous basis.

**Software Agent:** A computer program that functions continuously and autonomously in an environment in which other processes take place, and other agents exist. In today's environment, agents are known as shop-bots, but they are most widely used for information retrieval, while negotiations are not supported.

**Trusted Computer System Evaluation (TCSEC):** Basically, classifies systems into four broad hierarchical divisions of enhanced security protection. They provide a basis for the evaluation of effectiveness of security controls built into automatic data processing system products.

# Stumbling Blocks of Electronic Voting Revealed by U.S. and European Experiences

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## INTRODUCTION

The question of electoral participation has today become a major issue for the future of democratic systems. In the USA and Europe, voter turnout continues to fall. Faced with this strong erosion of political participation, the watchword is mobilization.

In this connection, several proposals, chiefly technical in nature, have been put forward to curb this rising voter absenteeism. For example, several projects have been developed with a view to putting in place new voting procedures, including among others, telephone voting, postal voting, computer voting, Internet voting, using pre-perforated cards, mobile phones or digital terminals installed in public places (shopping centres, public buildings, etc.).

## BACKGROUND

In the face of this multiplication of new experiences, it is in the interest of democracy to examine, in a rigorous and objective way, such developments, based on empirical material provided by the political entities that have tested one or more new voting methods. However, the relevant information is often dispersed among various governmental and electoral authorities and available solely in the political entity that initiated the experiment. It is therefore appropriate to summarize the main experiments carried out and the main lessons to be learned from them.

It is not possible, however, to review all the experiments or to cover every new possible voting technique, as this would require far more than a short article. Consequently, we will focus solely on USA and Europe, and on two forms of e-voting that are computer voting and Internet voting. Actually, there is a debate on the validity of this distinction. For some, the appropriate distinction is between attended e-voting and unattended e-voting. The previous supposes that the voter go to a polling station to cast a vote, while, for the later, the voter can cast his vote from any place where there is an electronic device connected to a network transferring the vote to the electoral authorities.

In this article, we do not follow this line of argument. The core distinction is between computer voting and Internet voting. In the previous, voters go to a polling station to cast a vote on a computer that is not connected to any network. In the latter one, the vote is cast through any electronic device connected to a network transferring the vote to the electoral authorities. Unlike unattended e-voting, the connected electronic device used can be in a polling station. The choice in this article is related to the fact that when there is a connection to a network (in the polling station or not), it has crucial consequences for the security of the system.

Within this framework, we will address only the most interesting experiments in terms of the issues involved in such changes. To that end, we have used public and semi-public documents[1], as well as scientific studies, for the purpose of our evaluation. On that basis, we will set out the details of the main experiments in this area, before highlighting the lessons learnt and problems revealed by those large-scale tests.

## COMPUTER VOTING

The most significant breakthrough in the use of NICT in the electoral process concerns computer voting. In numerous countries, regions and cities, its use is becoming increasingly widespread.

In The Netherlands, computer voting has become common practice for voters. At the last Dutch general election in May 2002, 95% of the Dutch municipalities

provided electronic voting machines (Nederlandse Ministerie van Binnelandse Zaken, 2003). Citizens in the Netherlands use touch panels to vote. In Belgium, since 1994, computer voting is used in several municipalities. At the last federal elections in 2003, computer voting had replaced paper-based voting in 34.1% of the country's cities (44% of the population)[2]. Florida is also noteworthy in this regard. A touch-sensitive screen was one of the voting solutions used in that state in the 2004 presidential elections to avoid the voting imbroglio of 2000. Finally, in various countries, including UK, computer voting is one of the new voting methods currently being tested (Office of the Deputy Prime Minister (ODPM), 2002)[3].

The success of computer voting cannot be explained in terms of convenience, since voters still have to go to a polling station to cast their vote. Therefore they do not save any time, or very little time. Moreover, observers agree that computer voting does not improve strongly the level of voter turnout at elections (MORI, 2003). Moreover, it is even possible that the queues caused occasionally by technical problems have discouraged certain electors.

The main advantages of this new voting technique correspond to objective such as ensuring the accuracy of counting and avoiding errors and spoilt ballots. With regard to the risk of fraud or malpractice when counting votes, computer voting is considered less vulnerable to "rigging" than paper-based voting or voting using preperforated cards. This security criterion is particularly important in countries where trust in the authorities is far from absolute (Saltman, 1998). In addition, and that is undoubtedly the main argument, computer voting avoids the problem of votes being invalidated because of voter errors such as double voting and spoilt ballots (Independent Commission on Alternative Voting Methods (ICAVM), 2002).

Nevertheless, those positive arguments are sometimes called into question by the assessments made in countries using computer voting. As regards the security and secrecy of the ballot, various problems have arisen. First of all, the elector identification and voting processes are often linked, which undermines the principle of ballot secrecy. Consequently, in Belgium and the Netherlands, the authorities have decided to separate the two processes. In Belgium, voters identify themselves to the chief returning officer of the polling station and are then given a magnetic card to vote. After they have cast their vote, the card is transferred to an electronic ballot box before being wiped and reused (Federal Ministry for the Interior, Belgium, 2003).

In addition to those initial technical reserves, there is the problem of the material impossibility of checking votes. In most cases, votes are counted by the computer as soon as the vote has been validated. That helps considerably to speed up the vote counting process and reduce costs in terms of human resources. However, recounts are then impossible. In order to overcome that problem, various solutions have been proposed, notably the "ticketing" solution, where a voting ticket is printed by the computer and collected in a sealed ballot box. Ticketing has been tested for instance in Belgium. It makes it possible to have a recount, either in the case of a problem or on a random basis in respect of a small percentage of votes. In other countries, the source code is given to the electoral authorities to allow the auditability of the voting system.

Finally, voting machines remain subject to technical uncertainties. Any failure can result in long queues, which may dissuade citizens from voting. In that case, the result is, of course, the opposite of that desired by the authorities (Detry, 2001).

From this initial survey, it can be observed that experiments with computer voting have dampened slightly the enthusiasm of the supporters of this new voting technique which is supposed to enhance considerably the security and rapidity of electoral arrangements.

Moreover, in addition to the reserves regarding counting, secrecy and accuracy highlighted during the various computer voting experiments, it also imposes a heavy financial burden on the authorities, because of the need to invest in equipment. Furthermore, the equipment cannot be used for other purposes (ICAVM, 2002). In addition, the changeover to computer voting cannot be seen as a purely technical operation. It is necessary, in any event, to adapt electoral laws accordingly (Bourgaux, 2001). However, that stage is very often neglected (Detry, 2001). As a result, in Belgium, legal proceedings have been instituted on several occasions against the legislator. (EVA, 2003).

In addition, the introduction of computer voting has an impact on the electoral results themselves. Research carried out by the *Vrij Universiteit Brussel* (VUB) has shown that the positioning of candidate lists in columns on the screen tends to favour the candidates placed at the top and bottom of the column (Deschouwer, Buelens, & Heyndels, 2000). For example, the 2004 Brussels regional elections, when there were sometimes as many as 88 candidates on each French-speaking list, highlights the pertinence of that aspect.

It appears from a survey of the public and private reports on computer voting in Belgium, the Netherlands and UK, that the success of this method does not necessarily mean that this change in voting methods has been accepted unreservedly.

## INTERNET VOTING

Of all possible uses of NICTs in the electoral process, Internet voting is undoubtedly the one which carries the most hopes. However, it is also the most debated and the most controversial. At the current time, Internet voting, or remote electronic voting, is not used widely in any country. In most cases, only limited experiments with pilot projects have been conducted. Nevertheless, the number of such projects is sufficient to provide a very satisfactory empirical basis from which some initial lessons can be learned.

In Europe, The Netherlands carried out Internet voting tests during the 2004 European elections (Figueiredo, 2003). In Spain, 15 000 voters from the village of El Hoyo de Pinares (Avila, North of Madrid) used Internet voting for a referendum (Mohanty, 2003). Three different tests were carried out in France in 2002 and 2003 (McMahon, 2002). Some Swiss cantons have also experimented with the use of remote Internet voting, notably Neufchatel, Zurich and Geneva (Trechsel, Mendez, & Kies, 2003). As part of the Cybervote project, financed by the European Union, three Internet pilot projects have been carried out in Germany, Sweden and France (Cybervote, 2003). Finally, in the United Kingdom, Internet voting was part of the new voting techniques tested recently. Outside Europe, it is mainly in the United States that Internet voting is being tested. In 2000, democrats in Arizona also used Internet voting during their primary election.

In this regard, three types of Internet voting can be distinguished (Internet Policy Institute, 2001). First, there is Internet voting at the polling stations, which is very similar to electronic voting, apart from the collection of data. The second method concerns Internet voting using kiosks installed in public places, such as libraries, schools and supermarkets. Finally, Internet voting from any computer connected to the Web is the freest method currently being tested.

The first problem related to Internet voting, concerns security. The principal risk is vulnerability to viruses and hacking, highlighted in particular in the Netherlands (Figueiredo, 2003). The second main problem concerns identification. As mentioned above in the case of computer voting, experience has demonstrated the need to separate the voter identification operation from the voting operation strictly speaking. Although that is possible when a voter goes to a polling station, the same separation is not possible in the case of remote voting. There is, therefore, a real risk of identify theft and various options are currently being examined in order to reduce that risk. For example, in UK, the recommendations are based on multiplying identification criteria (PIN code, date of birth, digital ID certificate). However, none of those procedures can guarantee absolute security in the case of remote voting.

In addition, from a technical point of view, several authors have stressed that a transitional period will be necessary for the introduction of Internet voting. Given the recent problems encountered with some pilot projects, various British experts consider that any plans to extend Internet voting must be implemented gradually. Changes in this regard cannot be introduced in the space of one election, not only because of the need to train the people supervising the electronic operations and acquire the necessary equipment, but also because of the need to familiarize electors with the method (ICAVM, 2002).

The second category of comments made concerning Internet voting concerns the reserves regarding the conformity of this new voting method with legal criteria for democratic elections. First of all, there is the question of ballot secrecy. Internet voting, like any form of remote voting, raises the question of how to guarantee that voters, without the protection offered by the privacy of the polling booth, are not subjected to any outside pressures when voting (Watch & Birch, 2002). The aim of secrecy is to protect voters from such influences.

Another problem is the question of equality. The issue here is not the principle of “one man, one vote” (OMOV), but rather the principle of equal access to voting. Numerous observers and academics have denounced what is commonly referred to as the digital divide. In their view, the introduction of remote Internet voting would accentuate the gap between different social classes (rich and poor; people having minimal qualifications and those having received higher education; young and old, visual impaired persons). This affirmation is based on several empirical observations. According to Norris, although Internet access is increasing in Europe, it continues to be more widespread among younger people and people with a higher level of education (Norris, 2002). Consequently, those groups would be more inclined to vote if Internet voting become the rule.

This digital divide seems to be confirmed by several national experiences with Internet voting. For example, in Arizona, young people and people having received higher education made the most use of Internet voting during the democratic party’s primary elections in 2000 (Solop, 2001). Although the electoral participation of young people in the 18-24 age group was low (2.1%), 75% of the people who declared that they had voted via the Internet were young people (Gibson, 2002). The British experience was the same (ODPM, 2002, p. 4-6). In California, it is the 55 and over age group that is the most opposed to Internet voting (Secretary of State, 2000).

Finally, it is necessary to reiterate that the main aim of considering new voting methods, including Internet voting, was to make it cheaper for electors to vote in order to achieve a higher voter turnout. However, it would appear that the success of Internet voting in this regard is somewhat mixed. In the canton of Geneva, fewer than 5% used Internet voting (Trechsel, Mendez, & Kies, 2003). In Great Britain, where electors had the choice as to which voting method to use, 41% of electors preferred to vote by post compared with 2.9% for Internet voting, 1.5% for telephone voting, 0.7% for voting by SMS and 0.2% for voting by electronic polling booth (British Electoral Commission, 2003). On the other hand, in Arizona, the use of Internet voting in the Democrats primary elections was 7.23% higher than in the previous presidential election.

Nevertheless, the mixed results in terms of electoral participation are not accompanied by a strong rejection among voters of this voting method. In UK, at the end of the pilot projects, a survey showed that 59% of the citizens having used Internet voting declared that it was "easy" or "very easy" (MORI, 2003, p. 46). In Switzerland, 91.6% of Internet users are in favour of Internet voting (Trechsel, Mendez, & Kies, 2003). In France during the Cybervote project, 22% of Internet voters said that their level of confidence in Internet voting was reasonable, while 68% said that it was high (Cybervote, 2003, p. 64). It would appear, therefore, that the low use of Internet voting stems not from the risks associated with this voting method, but rather from the lack of apparent advantages for voters in using it. In this regard, other remote voting methods, such as postal voting, are for the time being more popular (EGov Monitor, 2003).

## FUTURE TRENDS

Electronic voting is at a turning point. After a first experimentation stage, it is now being more widely used in several democracies. Computer voting received a satisfying appreciation from electoral authorities. As a consequence, several political entities using this form of e-voting are considering its generalization. Such evolution is for instance under consideration in Belgium. The main stumbling-blocks in that respect are related to security and re-counting issues.

By contrast, experiences of Internet voting raised more hopes, but also more fears. The digital divide, as well as security issues (hackers, frauds …) lead most countries to adopt a more sceptical stance towards Internet voting. None of the countries presented in this article has serious projects to generalize Internet voting. The sole form of Internet voting under consideration is computer voting in a polling station connected to the Internet.

## CONCLUSION

It would appear from the two parts of our analysis above concerning the various national experiences, that several conclusions can be drawn as to the advantages, drawbacks, and questions raised regarding the application of NICT to the electoral process. Both in the case of computer voting and Internet voting, the lessons learned can be grouped into three categories.

The first concerns technical considerations, and in particular voting secrecy. The various "wide-scale" tests have highlighted two major problems in this area. The first concerns the vulnerability of the hardware used, from the point of view of not only technical failures, but also hacking and viruses. In addition to that, there is the more fundament issue of voter identification. First of all, it is necessary to ensure the security of the procedure to avoid identity theft. In addition, there is a clear need to separate the identification and voting processes. Without those guarantees, the principle of ballot secrecy will be undermined.

The above reflection on voter anonymity leads to the second category of comments, namely compliance with the legal principles associated with any democratic election. First of all, as we have discussed, is the guarantee of ballot secrecy, where over and above the question of identification, there is also the difficulty of avoiding social pressure on the elector, which is a risk as soon as the vote is cast outside the *ad hoc* booth.

The second major legal principle which requires attention in the light of the national experiences concerns the principle of equality among voters. In particular, the use of IT methods, and all the more so in the case of Internet voting, raises the question of equal access for all social categories. This affects in particular people who are less familiar with IT systems (older people, people with a lower level of education, economically disadvantaged groups, etc.).

Finally, various socio-political questions have also been emphasized. The main ones concern the effect of the new voting methods on voter participation in elections. In this regard, the figures are mixed. In certain cases, no impact was observed, while in other cases a slight increase was recorded. In any event, computer voting and Internet voting attract are neither strongly supported nor virulently rejected. However, the majority of voters acknowledge the ease of use of the new methods. Likewise, no strong expression of distrust has been noted. Nevertheless, the use of Internet voting or computer voting is still relatively limited, when other options such as paper-based voting or postal voting are available. The explanation seems to lie with the fact that voters find it difficult to perceive any added value in the two voting methods discussed in this article.

Solutions are however conceivable with regard to the observations noted and questions raised. However, it is important to be particularly attentive in this regard, both as regards political decisions and academic research. As long as the necessary legal guarantees are not in place and ballot security ensured, these new voting methods will continue to be at a disadvantage compared with paper-based voting which has proved its worth over numerous decades. However, the social acceptance and resultant legitimacy of the new voting methods depend on these questions of effectiveness and added value. Without that, computer voting and Internet voting will continue to be disputed. Moreover, by extension, the whole electoral process will be called into question. There can be no doubt that no democracy can afford such a malaise.

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## KEY TERMS

**Attended Electronic Voting:** Form of electronic voting requiring that the voter go to a polling station to cast a vote.

**Computer Voting (or Automated Voting):** Form of electronic voting by which electors vote by following the instructions on the screen of a computer installed in a pooling booth, instead of by using a ballot paper.

**Digital Divide:** Several social groups (older people, people with a lower level of education, economically disadvantaged groups, visual impaired persons) have a more difficult access to IT. As a consequence, the introduction of IT in the electoral process would put certain categories of voters at a disadvantage, depriving them de facto of their right to vote.

**Electronic Voting (or E-Voting):** The use of one of more electronic means to vote and/or to process votes.

**Internet Voting:** Form of electronic voting by which electors vote by using a computer connected to the Internet. This operation can be take place in a polling booth, via interactive kiosks installed in public places, or from any computer connected to the Web.

**Ticketing:** Form of computer voting where a voting ticket is printed by the computer and collected in a sealed ballot box, in order to improve confidence in electronic voting and, eventually, recount in case of contest.

**Unattended Electronic Voting:** Form of electronic voting not requiring that the voter go to a polling station to cast a vote; the voter may cast a vote from any computer connected to a network transferring his vote to electoral authorities.

## ENDNOTES

1 We have avoided using reports drawn up solely by private companies involved in electronic voting, because of the risk that they might put their business interests before other considerations.

2 http://www.elections.fgov.be/Nouveau/NouveauFr/Docunfr/aspects/voteautomatise/Cdocu52.htm.

3 Interactive kiosks, the Internet, digital television, voting by computer, by telephone, by SMS, by mobile phone, etc.

# Successful Implementation of an E-Government Project

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## INTRODUCTION

Challenged to multiple pressures, the administration developed many initiatives aimed at modernizing its practices and offering the citizen customer (Thomas, 1999) a faster and better-quality service (OECD, 1996). From this perspective, the use of information and communication technologies (ICTs) is presented as an essential means of modernization (Poullet & Van Bastelaer, 1999). However, the declarations of intent sometime seem to be difficult to translate into efficient projects integrated in civil servants' daily work practices. A lot of case studies focus on best practices or analyze the reasons of failure of several e-government projects. There are fewer studies that position upstream and try to identify the key success factors of the introduction of ICTs into public services regarding their acceptance and appropriation by internal users.

## BACKGROUND

A review of the literature devoted to micro-analysis of e-government projects shows a primacy of perspectives focused on the impacts of these projects (on organization performance or services offered to citizens). Indeed, we note that the large majority of studies mentioned in the literature are centered on the effects produced by the introduction of ICTs into administrations or on individuals concerned with the change. They particularly consider work organization, frequency rate and use of the suggested systems. Other types of approaches are less frequent. Although several authors mention its interest, research focused on the context of e-government projects' implementation remains limited. Far from simply fitting into a reproduction process (automation of existing tasks or processes), ICTs are carrying certain organizational presuppositions (Alsène, 1990) that cannot be congruent with the context in which they are developed. In this respect, it appears essential to consider the specificities of the particular context of public administration. Several authors (Jae Moon, 2002; Jae Moon & Norris, 2005) stress the importance of considering contextual specificities, showing that some institutional factors can contribute to the adoption of e-government or have technical implications on project design (Riedl, 2003). Similarly, Heeks (2003, 2005) identifies "design-reality gaps" as potential explanations of e-government failures: According to him, success or failure of the e-government project depends on the size of the gap between current realities of the situation (the context of the project) and the design proposal for new e-government projects.

In addition, there is a need for considering nontechnical factors (representations, attitudes, motivations, reactions, etc.) in the analysis of innovation processes. We observe that the process of e-government project management, the way they are introduced within the administration, do not constitute the majority of researches. The technological project management or the changes that such projects suppose were certainly approached (Alsène & Denis, 1994; Boddy & Buchanan, 1986; Rhodos & Wield, 1985), but seldom in the context of the public administration. We can quote in particular Grabow et al. (2002), and Ho and Pardo (2004), but the latter do not identify specific success factors for public administrations. Adopting a more upstream position, Jae Moon and Norris (2005) explore the effect of managerial innovativeness in municipal government on the adoption of e-government and its outcomes. Their study finds an association between managerial innovation orientation and the adoption of e-government at the local level. Nevertheless, it does not focus specifically on e-government project management, but on government management in a larger perspective. The management style adopted can be considered as a potential success factor of the e-government project. Some studies (Eddowes, 2004; Heeks, 2003) examine both the relevance and availability of methodologies and techniques suited to the implementation of e-government or propose techniques to reduce the risks of e-government failures.

In this context, we propose to consider these two dimensions simultaneously (consideration of the context and process of project management) and illustrate their influence with two case studies carried out in Belgium. The central question of the analysis is the effective use of digital projects by the internal actors of the administration, their satisfaction and their appropriation of proposed tools. Within the framework of this article, we will only develop the intra-administration perspective, and

will not consider the aspects linked to the relationship with the citizen.

The analysis of uses shows a frequent shift between desired uses (i.e., the initial purposes assigned with a project) and the effective uses, or the way in which the tools are used on a daily basis. This observed shift often leads to an acknowledgement of failure of the project or, at best, an under-utilization of the system. ICTs, which are too often considered as simple technical objects, are carrying organizational changes and are the result of interactions between their users and the context of implementation. Consequently, we can usefully mobilize the contextualist analytical framework, whose specificity is to understand organizational phenomena by considering the elements of the context likely to influence them. Accordingly, we refer to the approach proposed by Pettigrew (1985, 1987, 1990), in which he articulates the *content*, referring to the dimension submitted to the change (here: the e-government project), its *context* (factors likely to influence the content and its evolution) and the *process* (the complex interplay of power relationships among various actors concerned with the transformation of the organization).

Consequently, our analysis focuses on the factors that influence, and even structure, the uses, from the design of the project to its effective implementation within the organization. This analysis, combined with empirical observation, leads to formulation of some management observations relative to the necessary consideration of the context and the management process likely to optimize the uses of the installed tools.

This text is based on two case studies carried out within the framework of two research projects in public administrations. The first study examines the modernization of an inter-departmental human resources database managed by a central federal department, was generally perceived as a failure: Users did not use the proposed tool and showed no appropriation of it, and this under-utilization led to its abandonment. The second analysis, the development of a municipal intranet aimed at easing and stimulating the interactions between the different administrative services of the town, was a genuine success in terms of utilization, appropriation and satisfaction of the users.

The common point between these two cases is their aim to inter-connect and stimulate the collaboration and exchange of content between various departments of the same political decision level.

We use a qualitative methodology for both cases, consisting on one hand of interviews with the promoters and originators of the project as well as internal users within the administration, and a documents analysis on the other hand. For each of the two cases, we will present:

- The contextual variables, whose consideration supported the success or, on the contrary, whose non-consideration can be identified as a factor of failure, or at the very least a source of difficulties in the setting of the project
- The processual variables, namely, dimensions which, when were integrated in piloting and the setting of the project, supported a successful introduction of ICTs into the administration and *a contrario* when they were neglected, led to an under-utilization and then consequently an abortion of the system. These variables are mainly focused on the consideration of the actors and their interests, and the power games surrounding the project.

## CASE STUDY 1: THE MUNICIPAL E-ADMINISTRATION

These municipal authorities simultaneously set several e-administration projects both for the citizens and personnel. We will focus only on the projects intended for the latter (internal tools, back-office tools) or on the internal aspects of the projects developed for citizens (not the interfaces between citizen and civil servants).

This local administration has been involved for several years in many projects related to the introduction of ICTs, wishing to be perceived as an up-to-date administration. This wish, held by the burgomaster, was relayed at the political level, and was also made effective through collaboration with the private sector. This collaboration was translated in a computing equipment acquisition at very low cost for the administration.

In terms of equipment, the municipal authorities were equipped with several workstations in a local network (Intranet) with high capacity (an optical fiber installed by the municipality), connecting all services and establishments of the municipal authorities, based in several villages. All systems were developed simultaneously in the same computing environment, with the same ergonomics. This total standardization of the computing environment aimed at an easier appropriation of the various applications that will allow, in the long term, the mobility of agents in the various administrative offices.

The ICT process of these municipal authorities has led to the installation of an Autonomous Office to accompany the process, to free bureaucratic constraints more easily. Thus, the authorities decided to create a public limited company, whose objective was computing and communication in the municipality and, later on, the marketing of what was developed by other administrations.

The autonomous office was directed by a board of directors (majority of administrators designated among

the municipal advisers), which appointed a management committee in charge of everyday management. The fact of having actors from inside the administration convinced of the utility of the ICT projects had a facilitating effect. These municipal actors (high level) act as an interface and link the Office and municipal authorities closely. The statute of this Office enables it to recruit people within a different statutory framework, more flexible than that of municipal authorities (contracted personnel). In addition, the entire dedication of employees from the autonomous office to their ICT projects made it possible for civil servants to benefit from these projects without having extra work load due to their installation and maintenance.

Since the beginning of the e-administration project, an analysis of the administrative existing procedures was carried out by a mixed think tank composed of municipal personnel and a team of computing consultants. The civil servants were interviewed by an external consultant, so they could express themselves about their daily tasks, difficulties and so forth. This consultation was controlled by project management professionals who made it possible to express the requirements and translation of the requirements in logical and technological language.

The civil servants were mobilized into working groups, and took part at the various stages of setting up the project. They were asked to give opinions, which were actually taken into account. They learned how to look at their work practices from a new angle. A general long-term innovating dynamics was born and allowed a real mobilization of the actors. The promoters of the projects (i.e., the office) tried to adapt workstations according to the users' degree of ability to use the new tools.

The philosophy behind the project was that each worker was able to do the same job as before but using new tools. The development of the teleservices and teleprocedures consequently (almost) did not result in job rotation or major organizational changes. However, the ICT projects highlighted the possible time savings. The reorganization of the services resulted in the strengthening of the back office. Liaison officers were placed on the level of the various services to ease the projects implementation.

At the beginning, the majority of the municipal personnel had only very few computing competences; thus, they did not have particular skills for ICT implementation in their working methods. The introduction of the software was done progressively, starting with relatively simple applications, and supported by training. Thus, starting from a basic level, the municipal agents saw their computing competences increase, which they could use very quickly in their daily work.

The first software installed on the municipal network were electronic messaging and shared agenda. As soon as all of the civil servants (100 people) were plugged in the network, the use of e-mail was completely opened: The rules of e-mail use were deliberately very flexible. A great confidence was granted to the users to support the in-use self-training and especially the appropriation of this tool. The information and familiarization of the users to the added value of the projects in their daily work were developed throughout the project. Stress was laid on accountability, transparency, flexibility, saving of time and increased efficiency. In parallel, these projects provoked few fears or rejection on behalf of the municipal agents, insofar as they were not threatening for their jobs and did not cause major upheaval in the nature and quantity of work. On the contrary, most of the agents were shown to be very motivated to take part in the process, insofar as this resulted in more accountability and autonomy in their work. In response to expressed needs, several administrative procedures were digitized. However, the information management and mail management procedures are still subjected to the same cycle of approval (official channels). They were not reduced at the time of this digitalization. The approval cycle, however, became more transparent. In short, the internal e-government projects can be considered as successful, not in terms of innovation and process reengineering, but in terms of appropriation, effective use and users' satisfaction.

## CASE STUDY 2: THE HUMAN RESOURCES (HR) DATABASE

This administration supported the project for a certain time to build a database (DB) whose aim was to gather various data **as** several data on the personnel of various federal public services. HR information gathered for this DB was to come from several departments distinct from the promoter of the project. The users of this DB, also data suppliers, are very different in terms of size, equipment and means. Their practices regarding the DB are also much diversified: Whereas some large administrations provide a large amount of data without facing difficulties, other administrations, smaller, less equipped or whose personnel is less qualified, provide partial data or encounter problems to conclude this task. In the latter case, the head of department does the work according to his availabilities, whereas the task to be achieved is often decentralized on the level of smaller units in the first case. In the same way, the heterogeneity of the users' needs in terms of HR data also involves a variable use of the DB. The bureaucratic organization and the inter-departmental compartmentalization led to a phenomenon of computing "territoriality." The computing baronies rest on networks or computing tools that developed in the course of time within the various departments of the same

administrative entity. These developments were carried out in parallel by means of internal personnel, without any dialog between the teams in charge of the development design. As a result of this, the systems composing the same administrative entity are often not compatible (in most of the cases, the work of setting compatibility is in hand). The birth of the computing baronies tends to limit the possibilities of effective and efficient electronic exchanges.

The existence of parallel but non-compatible systems, the will of each service to keep control on its own tools, but also the absence of constraining coordination mechanisms is likely to slow down the possibilities of devolution of the networks, which would make it possible to establish electronic relations between administrations (of the same ministry) linked according to a "supplier-customer" model.

In this case, the situation seems divided between two contradictory tendencies: On the one hand, an administration implements its own HR policy in a decentralized way; on the other hand, the project developed by the administration is an HR database, with statistical vocation, centralized within a general service of administration. To not consider this situation goes against the success of the project. The extent to which this situation seems problematic actually carries out with the statute granted to the DB as a statistical tool or HR management tool. This ambiguity around the purposes of the system caused considerable questions from data suppliers: Does the tool aim only at data collection? Is it also used to exert a form of control on the administrations? What about their autonomy, consequently? What are the respective roles of the users, data suppliers, managers of the tool and political "supervisors"?

Anxious to preserve their autonomy, to locally manage their own data with their own system, the administrations using the system showed much resistance to the tool and its use. The development of this tool, instituted by Royal Decree, was carried out without holding a preliminary consultation of the users, who are also information providers. The latter are, thus, in charge of additional workload (to provide information) without having had the opportunity to express their needs or questions as to the relevance of such a project. Although this DB can indeed cover interesting aspects for the various services concerned, the absence of familiarization and analysis of preliminary needs did not make it possible to highlight these advantages. The users, thus, regard this project as a useless constraint, an extra workload deprived of the least element of motivation. Moreover, the users supplying the data did not receive any clear and precise information on the various possible uses of the DB, nor profited from training to the use of this software. As a result: They sometimes waste a lot of time trying to understand how to use it in an optimal way. The lack of incentive to establish collaboration, the absence of preliminary identification of the user's needs, while at the same time those users occupy a central place as data suppliers, led to a slow asphyxiation of the project. Less and less data received and poor-quality data were the most visible signs of the progressive failure of this project. In such a context, the introduction of a technological innovation is obviously not recognized as a success: The civil servants, seeing their workload weighed down by contribution to a tool without perceiving its added value, boycotted the project. A few months later, the project was abandoned.

Literature and the reading of these cases show that an e-government project is more likely to be successful if the project manager considered two dimensions during its design and implementation: the specificities of the context and the actors in presence. Though we examine both these dimensions successively, we do not pretend that they are independent. To the contrary, the contextualist model asserts that the contextual and processual variables are closely linked, the one possibly being a reply to the other. It is, thus, very hard to really isolate the one dimension from the other.

## CONSIDERATION OF CONTEXTUAL SPECIFICITIES

The context in which the introduction of projects based on ICTs appears to be an element of prime importance. Specificities of the public sector cannot be ignored in the design and implementation of e-government projects.

First, the civil servants' work depends on the political supervision of their administration. Political time is fast and short, contrary to administrative time. The management of the public sector, thus, is confronted with a double temporality and fragmentation of the decisional capacity. Moreover, the work organization and decision-making are subjected to particular lawful systems, such as year-limited budgets, making strategic management in the medium- and long-term more random than in the private sector. The law on public markets, for example, adds an element of complexity in the equipment policy because of the lengthening of deadlines and constraints that this law implies as regards the choice of the supplier. Being conscious of this potential source of difficulties, the municipal e-administration set up the Autonomous Office as an answer to a contextual fact. This allowed a faster decision-making process and more freedom regarding the statutory framework.

Civil servants profited for a long time from a particular statute, initially intended to ensure a certain independence compared to the political world. However, this has some limit, particularly in terms of accountability. In addition, the current coexistence of personnel under the

statute and a growing number of contracted personnel also raises particular questions in terms of HR management. Again, the setting up of an Autonomous Office next to the municipal administration facilitated the avoidance of such a problematic situation by enabling more flexible recruitment policies to hire computer scientists.

Finally, several organizational dimensions have to be considered, particularly in bureaucracies. Public organizations, frequently characterized by centralization and compartmentalization, present situations of systems incompatibilities and difficulties to network. This appears particularly in the HR DB case, where the equipment heterogeneity constituted one of the important threats to the project.

The following list summarizes the contextual specificities important to consider.

- Dependence on political supervision
  - Double temporality
  - Fragmentation of decisional capacity
- Particular lawful systems
  - Year-limited budgets
  - Law on public markets
- Administrative statute
  - Limits in terms of accountability
  - HR issues due to the coexistence of personnel under statute and contracted personnel
- Bureaucratic organization
  - Centralization
  - Compartmentalization
  - Systems incompatibilities and computing baronies

## TAKING ACTORS INTO ACCOUNT

Contextual specificities can be considered as given, and they have to be taken into consideration. Furthermore, it is a matter of looking at the actors' interventions: The mobilization of these dimensions by actors, following their interests, implies that the context is not always simply an objective data, but can become a construct. In other words, the environment constitutes a constraint for the action but is also built by various categories of actors. As Nizet and Pichault note (1995), the organization and environment are created together through processes of social interactions of the members of the organization. This is not without impact on the way in which ICTs will be perceived and used:

*The bureaucratic structure and the internal procedures of the large organizations (organization, principles of management, the particular system of gratification of the agents, etc.) the attitude and the reactions of the users with regard to the technological innovations influence a bureaucracy slows down in particular the diffusion of new technologies.* (Bretschneider & Wilmer, 1993)

In addition, the organizational actors, whomever they are, do not involve themselves in a change process—only if they perceive this as potentially positive for them in terms of values or interests (Crozier & Friedberg, 1977; Nizet & Pichault, 1995). Moreover, if this change is not perceived as a judgment of their practices (Peters & Savoy, 1998), actors are more likely to embrace change. The HR DB project completely neglected these aspects by proposing a tool without real usefulness for them. Besides, some of them were already equipped with more effective software or did not need to use one.

Power games also influence people's behavior. Because of power relations existing between actors in any organization, various constructions of the context are often conflicting; that is, interests of the various actors being generally divergent. In an organization with centripetal tendency, as it is the case for many public administrations, users are likely to adopt more defensive attitudes and/or withdrawal (Agro & Tavernier, 1999).

The way the project will be introduced and especially the methods of users' involvement appear of capital importance for the implementation of an e-government project. Various stages appear crucial in this respect. Some are frequently evoked in the literature relating to computing project management, but seem seldom used within the framework of a digital administration. Let us quote a design of the project, first of all based on a rigorous analysis of the needs and not on the only expression for the will of a political actor or fashionable trend.

The HR DB case shows that the neglect of this stage can drive to under-utilization or even a boycott of the proposed tool. This DB met no needs and had no added value in the users' work. Due to this inadequacy, the users did not enter the required information and the project ran lower every day.

The e-government project will ideally take place in a plan of total development. Indeed, integration of the project in an organizational strategy and a broader policy of communication appear essential. The promoters of the project will be attentive in particular with current work practices and organization and the potential reorganization of the work processes that this kind of project imply. In the e-municipality, the project was designed to not disrupt the work processes, and it is probably one of the success factors of this project in terms of appropriation and users' satisfaction. To the contrary, HR DB promoters did not consider the work practices in use; this had negative effects on the users' opinions of the tool and on their later participation with it.

In addition, the information and familiarization of the users to the finalities of the project and its added value, and the training of these users to the implemented applications, without a doubt constitute a critical factor for later uses of the system. The presence of driving actors exclusively dedicated to the project, and having necessary competences, also seems a facilitator, as was the case in the municipal e-administration. The HR DB case is a counterexample in this respect, since its finalities were the subject of questions or even worries and, consequently, generated much resistance.

Project managers will bear in mind the need to involve various actors (decision makers, users, technical experts) at various key times of setting up the project, supporting a bottom-up approach. Several works (Agro & Alii, 1995; Bijker, 1992; Flichy, 1995) contributed to show the importance of the "social construction of technologies," underlining how decisive emergent uses, alliances, communication, users' involvement strategies, and so forth are. Such reports result in thinking the innovation like an "*interessement*" process (Latour, 1992) considering technical, social, economic or organizational dimensions.

The following list summarizes which dimensions linked to the actors should be considered during the piloting process.

- Analysis of needs
- Integration in a total development plan (organizational strategy, broader communication policy)
- Attention to current practices and the reorganization of work
- Information/familiarization of users (finalities, added value)
- Training
- Presence of competent driving actors dedicated to the project
- Involvement of a different kind of actors (decision makers, users, technical experts) at various key times of setup
- Interactive approach

## CONCLUSION

As one sees it through this contribution, many obstacles can draw up in front of an e-government project. Considering some dimensions of the context and project management cannot certainly guarantee without the slightest doubt the success of the project, but can, however, constitute key factors of success. One of the essential conditions for an e-government project to be successful, according to us, is that the administration that undertakes such projects is ready to question its procedures, organizational practices and, in particular, its pre-existent modes of control, even the preliminary draft itself. ICTs, to deploy their full potentialities and be adopted by users, must open spaces of freedom, innovation and discovery to them. In this way, they will not be perceived as being an additional layer of constraint to usual bureaucratic operations. The harmonious implementation of the e-government project and its finalities in its specific context thus supposes to consider this last, and identification of the space left at the disposal of the project pilot to circumvent the principal constraints or solve the inherent difficulties. The style of management adopted by the persons in charge for an e-government project plays a decisive part in the orientation of the process. A central element within all stages of the process is to make users understand the utility and added value of the project in their daily working lives. To convince the users, it is necessary to involve them in the process. This axis is essential for better comprehension, acceptance and use of the system (Rondeau & Chouakri, 1993). However, the choice of such project management is better suited to long-term processes, and even if the implementation is a lengthy process, it will contribute to the maintenance of the project in the long run and perpetuate its uses.

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## KEY TERMS

**Centripetal Tendency:** Tendency that characterizes organizations whose capacity is concentrated at the strategic top and in the hierarchical line, as it is the case for many public administrations.

**Computing Baronies:** Phenomenon of computing "territoriality" due to bureaucratic organization and compartmentalization. It appears as networks or computing tools developed in parallel without any dialog between the teams in charge of the design, and thus often are incompatible.

**Contextualist Analytical Framework:** Theoretical model proposed by Pettigrew, based on a change model that articulates three central dimensions: the content of change, the change process itself and, in particular, the contexts (both internal and external) where change happens.

**HRM:** Human resources management.

**Interessement Process:** Measures aiming at favor investment (or mobilization) of all the parts in presence in a project.

**Key Success Factors:** Factors that, when considered, can favor the project success and, when neglected, can lead to project failure.

**Users' Involvement:** Various practices that associate users in the tools' conception and development processes. These practices lead to a better consideration of needs. They also constitute a good means to soften resistance to technical and organizational changes that accompany the introduction of ICT projects.

# Suppliers' E-Maturity for Public E-Procurement

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## INTRODUCTION

Business transactions require involvement from both customers and suppliers. This is the case whether the transaction takes place on-line or off-line or whether the transaction is businesses to business (B2B), businesses to consumers (B2C), or businesses to administration (B2A). At the beginning of the e-commerce era attention focused mainly on business to business and business to consumer relations. Today attention has shifted and the possible commercial benefits resulting from e-commerce with the public sector are now also on the agenda (Andersen, 2004; Coulthard & Castleman, 2001). Regardless of whether e-commerce is performed in a private or a public context, it is commonly assumed that e-commerce can lead to shortening of transaction time, lowering of costs, increased transparency, improved sharing and maintenance of enterprise information, and an increased internal and external efficiency of the organization (Zwass, 2003).

In this article we will focus on and use the term e-procurement to refer to the use of electronic means in purchasing processes. These processes include seeking information about goods and services and ordering and paying of goods (Andersen, 2004). A number of issues concerning e-procurement have been studied recently. Among these issues is the required architecture of e-procurement systems (Liao et al. 2003), the tendering process in e-procurement (Liao et al., 2002), and the possible economic gains achieved from public procurement portals (Henriksen & Mahnke, 2005.

Common assumptions for these studies suggest a pool of suppliers willing to offer goods and services through e-procurement channels as well as a concurrent demand for goods and services in e-procurement channels among public sector institutions. In the Danish context there has been some reluctance to adopt e-procurement among the public sector institutions (Henriksen & Mahnke, 2005). Whether this reluctance to adopt e-procurement is caused by the classic problem of who is to embark the marketplace first: buyers or suppliers (Bakos, 1991) is still to be decided. In this article the focus is on the challenges that suppliers to public sector institutions face. In recognition of the broad scope of issues that suppliers have to consider when including e-procurement in their business activities, a model has been developed for assessing e-maturity. The model is designed to embrace two aspects of e-maturity: the technological aspect and the organizational aspect. Whereas this article is conceptual in nature, the proposed assessment model is empirical, estimated in earlier work by Henriksen, Kerstens and Andersen (2004b).

## MATURITY MODELS FOR E-PROCUREMENT: FILLING THE ONTOLOGICAL VACUUM

The terms "maturity" and "immaturity" are often used to characterize a state of a given level in a continuous process. The terms are used relative to their objects, for example, "e-commerce is still in an immature state." This use of the term "immature" in relation to e-commerce creates an ontological vacuum since both the term and its object are somewhat fuzzy. The concept of e-commerce represents a plethora of aspects both related to organizational and technological issues as well as to business functions and supportive activities (Zwass, 2003). Adding the notion of maturity or immaturity does not strengthen the ontology of the concept. Some qualitative and/or quantitative measures to determine what characterizes different degrees of maturity are necessary.

There are a number of academic disciplines that use the term maturity and then develop maturity models as classification schemes. In the field of *software process improvement* the capability maturity model, a measure of maturity, is used to determine how structured the soft-

ware development process is (Paulk et al., 1995). Within the field of *business economics*, examples of explicit usage of the term maturity are found in the product life cycle concept (Lancaster & Massingham, 1993; Robson, 1997).

In the *information systems field* the term maturity is also familiar, for instance in the context of the "Stages of Growth model" (Galliers & Sutherland, 1991). The stages of growth model illustrates the organizational stage in a development process where the organizational usage of IT is measured. Whereas Galliers and Sutherland (1991) decomposed maturity into six stages with each stage characterizing the presence of particular attributes of the organization, the strength of the stages of growth model is in its focus on IT *and* organization. This overall typology of technology and organization is used as a point of departure in the further development of an e-maturity model where focus is on the organizational and technological capability and the readiness of suppliers to engage in e-commerce.

Before discussing some often used classification schemes based on maturity models, it should be acknowledged that not all researchers agree on the suitability of "evolutionistic" development models as a means for measuring IT capabilities in organizations (e.g., see King & Kraemer, 1984). Acknowledging this critique of maturity models, we stress that the four levels of our proposed model outlined in the following section do not appear as distinct stages in a practical setting. The four levels rather represent discrete points in a continuous development process in the organization. The four points should therefore be used as indicators for positioning the organization in the e-commerce landscape and not be regarded as absolute measures.

## THE FOUR MATURITY LEVELS

Our proposed assessment tool has four levels reflecting the four *stages* of maturity. The first level of maturity refers to a situation where the supplier has not realized any need for e-commerce. No changes due to shifts in environment or technology developments have affected the behavior of the organization. However, due to pressure from business partners some e-commerce actions may have been implemented.

At the second level the supplier uses one e-commerce channel, often an e-shop. Limited resources are invested and only small organizational adjustments have been made. Most business routines are still carried out manually.

The third level is characterized by an explicitly formulated e-commerce strategy where critical success factors have been outlined. More channels are used and the organization has changed some business routines. Investments in e-commerce are seen as opportunities for cost reduction and, at the same time, seen as a way to free resources for more service oriented tasks.

At the fourth level, the supplier uses several e-commerce channels. Individual customer support has a high priority. Manual routines are replaced by fully automated procedures. The aim is to achieve full integration of data internally in the organization and also to be able to provide integration of data to customers. E-commerce is now seen as a tool to increase customer and employee satisfaction.

## THE PARAMETERS OF THE ASSESSMENT TOOL

Each of the four maturity levels is assessed through estimation of a series of parameters. In the subsequent sections the seven parameters of the tool for assessment of e-maturity of a supplier are presented. The parameters are primarily based upon Galliers's *stages of growth model* (Galliers & Sutherland, 1991) and upon the *CIVO-VIDS (abbreviations for capabilities, interactivity, values, orientation-volume, integration, depth, spread) variables* (Andersen, Juul, & Larsen, 2001; Andersen, Juul, Henriksen, Bjørn-Andersen, & Bunker, 2000). The parameters have subsequently been adjusted specifically to assess e-maturity with respect to e-procurement. Each of the seven parameters is divided into four levels of e-maturity where each level represents a certain degree of maturity ranging from *immature* to *mature* e-commerce commitment. The seven parameters are described briefly in the following sections.

The parameter *strategy* relates to the visions and goals of the organization. Strategy is typically outlined by top-management with explicit expectations towards e-commerce. *Strategy* is thus an indication of the ambitions of a supplier with respect to e-commerce. A clear strategy is essential for achieving success in connection with all projects involving major organizational change (Davenport & Short, 1990), especially in connection with e-commerce projects (Rajkumar, 2001; Kalakota & Robinson, 2001; Neef, 2001). Kalakota and Robinson (2001) suggest a classification of strategy based upon the attitude of management towards technological advances and new market opportunities. According to this classification, the attitude can be categorized as: *visionary*, *pragmatic*, *conservative*, and *skeptical*. These correspond to the four strategies outlined by Ackoff (1974).

The parameter *e-commerce model* is defined as the specific electronic relation used to connect suppliers to customers. Based on the degree of innovativeness and the extent to which the applied *e-commerce model* is

*Table 1. Supplier strategies (Adapted from Ackoff, 1974)*

| | Passive | Active |
|---|---|---|
| Planned change | Inactive strategy<br>"Sceptical" | Proactive strategy<br>"Pragmatic" |
| Situated change | Reactive strategy<br>"Dynamic conservative" | Interactive strategy<br>"Visionary" |

*Table 2. Maturity levels and estimation parameters*

| Parameter | Level 1 | Level 2 | Level 3 | Level 4 |
|---|---|---|---|---|
| **Strategy** | *Sceptical*<br>No belief in the possible technological opportunities created by e-commerce | *Dynamic conservative*<br>Small investment and resource allocation<br>seen as a way to create value | *Pragmatic*<br>Result orientation where e-commerce incentives must fulfill the expectation | *Visionary*<br>Market leader where<br>e-commerce initiatives are independent of other companies |
| **E-commerce model** | *Conventional sales channel*<br>On-line presence | *Single channel (experimental)*<br>Often in the form of an e-shop | *External e-commerce models as a pilot project*<br>A single channel is expanded with distribution of e-catalogues to e-procurement systems and/or e-marketplaces | *Multiple digital channels*<br>Full use of and integration of e-procurement, e-marketplaces, and e-shop |
| **Process** | *No change*<br>Manual processes<br>Employee intensive sales process | *Adjusted*<br>New tasks are incorporated in the old process which is still dominant<br>Mostly manual tasks in the sales process | *Streamlined*<br>Eliminate unnecessary operations<br>Processes are streamlined<br>Reduction in process cycle time | *Innovative*<br>Process vision<br>Re-engineering<br>Value-added re-design of the sales process to gain more value<br>Dramatic changes<br>Incorporating new business opportunities |
| **E-catalogue** | *Digital catalogue*<br>Distributed via off-line means<br>Infrequent up-dating | *Content management*<br>Make internal product information external and available to customers<br>Manually prepared | *Automatically generated*<br>Frequent and online updating<br>Supports different standards | *Customized*<br>Contains product information based on customer demand<br>Is digitally handled |
| **Integration** | *No integration*<br>Printing of orders and messages<br>Manual handling | *Low integration*<br>Conversion of e-mail to ERP-system<br>Few document types<br>Manuel typing of data<br>Few entities | *Medium integration*<br>Replicating order information as a batch process between ERP and the e-commerce model.<br>No external integration<br>Several document types<br>Automatic<br>Many entities | *Full integration*<br>Digital transaction of information to ERP-systems<br>Buzz-talk (all document types)<br>Real time<br>Integration to the customer |
| **Organization** | *Conventional order-handling*<br>Do not use technological opportunities | *Parallel tasks*<br>Much manual typing of data<br>Employees create externally understandable product information<br>Transaction based operations | *Tasks related to product information on customer demand*<br>Education of the sales force<br>The employees learn new tasks and procedures in the e-commerce process<br>Reallocation of employees and reduction of the sales force | *Account management*<br>The sales force support different e-commerce models<br>CRM |
| **Management/ control** | *Individual*<br>Enthusiastic employees<br>Generally no recognition of needs | *IT department*<br>e-commerce is seen as an IT project | *Marketing*<br>e-commerce is seen as a commercial project | *Executive*<br>Interorganizational<br>e-commerce coordination |

functionally integrated (Timmers, 2000), four types of *e-commerce models* of relevance for suppliers of goods to public sector institutions can be identified: *online presence, e-shop*, *e-procurement*, and *e-marketplaces* (Rajkumar, 2001; Neef, 2001).

The parameter *changes of sales processes* includes all the different activities, routines, and procedures which occur in connection with sales activities. *Sales processes* can be divided into two main groups of processes: negotiating framework agreements and carrying out sales operations (Andersen, 2004). The extent to which the sales processes have changed with the introduction of e-commerce can be used as a general measure of the improvement of the effectiveness of the sales processes.

Hence, this can also be used as a measure of the decrease in the duration, as well as the costs, of the cyclical sales processes. The changes of sales processes which the supplier has undertaken to accommodate e-commerce can be categorized as: *no change, adjusted*, *streamlined*, and *innovative (*Ambeck & Beyer, 1999).

The parameter *e-catalogue* comprises a supplier's digital product information which can be divided into four stages: *digital, content management, automatically generated,* and *customized.* The digital catalogue is a basic representation of goods distributed via digital media, often in the form of a CD. In the next stage, where the supplier employs *content management*, more effort is put into the user interface. This is often a major challenge for suppliers (Heywood et al., 2002) because the product information is usually spread among several different systems and because the information can be difficult to understand for many customers. *Automatically generated* e-catalogues provide buyers with systematic product searching facilities. Continuous and precise electronic up-dating of the e-catalogue is automated. The most developed level of the e-catalogue is where the catalogue is *customized* to fulfill the particular needs of individual customers.

The parameter *integration* refers to the extent to which back-office systems are integrated with the front-office systems, and the flow of information (e.g., sales orders between internal organizational units of the supplier, as well as external autonomous units) is adequate and coordinated (Andersen et al., 2000). The parameter is measured on a scale with four levels, ranging from *no integration* to *full integration*.

The parameter *organizational changes* is a measure of the number of changes that occur in the organization as a consequence of e-commerce implementation. The parameter also includes possible down-sizing and shifts of responsibilities between various departments due to e-commerce. When sales procedures are digitized, new employee skills are required and job profiles may change. This, in turn, may lead to staff changes, employee replacements, the need for employee training, as well as new recruitment strategies. Likewise, the organizational culture is assessed, for example, down-sizing is likely to have negative effects on the organizational culture, thereby causing resistance from the employees towards the introduction of e-commerce. The scale of maturity with respect to organizational change ranges from conventional task handling to account management.

The parameter *management and control* measures the degree to which e-commerce is considered to be an integrated part of the organization by top-management, the marketing department, or the IT-unit, etc. The assessment of the parameter can be made by investigating the allocation of resources for e-commerce projects, the priority of e-commerce projects, and whether or not the e-commerce projects have got a strategic, tactic, or only operational status within the organization. Likewise, it is of major importance to know whether the e-commerce projects have been carried out as a result of managerial dispositions, whether decisions are made on departmental levels or initiatives are taken by a few enthusiastic employees. The scale concerning management and control comprises the following four parameters *individual, IT department, marketing,* and *executive.*

## DISCUSSION AND CONCLUDING REMARKS

The focus of this article is to identify a tool for measuring the maturity of e-procurement for suppliers of goods and services to public sector institutions. One issue that is compelling to discuss in this context is whether or not e-maturity is of higher importance in business-to-administration relations compared to business-to-business relations. The public sectors' e-procurement has characteristics which, in our view, require a high e-maturity level from the suppliers. An issue to be kept in mind is that public sector institutions purchase goods in order to provide a variety of services to citizens who are often very dependent on the services provided, for example, health care and education. Supplies of for example medicine in health care have to be in place when there is a need for it, though lack of supplies impedes production processes in the business environment it is rarely a matter of health or vigour if supplies are not in place as might be the case in the hospital system. In addition, many "production units" in the public sector are very dependent on basic supplies, often representing a marginal value compared to the cost of running the service. An illustrative example of this situation is in hospital service. The cost of rubber gloves is marginal compared to the cost of running the hospital, not mentioning the personal costs of cancellations due to a situation where the hospital runs out of stock of rubber gloves. This is apart from the fact that public institutions have close budgetary control and pay political attention to reducing costs (Henriksen & Mahnke, 2005). This requires advanced IT systems which are expected to improve efficiency. Although e-auctions as e-Bay has become a popular channel for procurement in the private households (Frei & Rodriguez-Farrar, 2001) because they provide an ideal competitive environment both for buyers and suppliers. However, based on the above-mentioned considerations on the requirements for timely delivery of supplies, e-procurement via e-auctions is not a suitable option for many public sector institutions.

Due to the need for controlling procedures, purchasing is ideally suited to electronic procedures (Liao et al., 2003). This requires transparency in all business processes, ideally through full integration of data. Public sector institutions buy commodities, which are mostly purchased repeatedly (e.g., office supplies, provisions, and nursery supplies). Ideally, e-procurement is supported by CRM systems (customer relationship management systems). CRM systems can furthermore support punctual delivery, often crucial due to the type of services performed by public sector agencies (e.g., eldercare, where nursery supplies have to be in place). These conditions speak in favor of highly structured processes within the suppliers' organization. The suggested parameters indicate that an organization operating at e-maturity level 4, where integration, customization, and real-time updating of product information is a must, has to be highly structured.

The point of departure in this contribution has been the individual supplier operating in the market. No distinction has been made between whether this market is the traditional market or if it is an electronic market (e-marketplace). In an e-marketplace suppliers and buyers are linked via electronic means typically based on an Internet interface where buyers log in and perform their transactions based on e-catalogues provided by suppliers. One trend which as been observed in the Scandinavian context is that the public sector takes its suppliers into an e-marketplace (Moe, Andersen, & Henriksen, 2005). By chosing this apporach the public sector can negotiate framework agreements embracing all institutions in a given unit. This approach is beneficial for buyers because it provides transparency and standardized purchasing information. The implication of the switching to e-marketplaces for the suppliers is that it is crucial that they operate on level 4 parameters in our e-maturity model with respect to the technological attributes.

Level 4 parameters are closely related to the technological attributes of e-maturity. However, given that organizational support and consensus are needed, powerful IT-systems alone will not be enough. It is therefore be stressed that the e-maturity model should be seen as a holistic framework, where organizational issues cannot be separated from technological issues.

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## KEY TERMS

**E-Auction:** Defined as online organized processes of buying and selling by offering bid, taking bids, and selling products and services.

**E-Commerce:** Commercial activity that takes place by digital processes over a network as direct cabling, third party vendors (EDI), internet or mobile network.

**E-Marketplace:** A digital platform that enables multiple sellers and buyers to enter, perform business transactions, and exit.

**E-Procurement:** Digital business-to-business purchase and sale of supplies and services.

**Maturity Model:** Characterize a state of a given level in a continuous process.

# Survivability Issues and Challenges

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## INTRODUCTION

An electronic government (e-government) is essentially an amalgam of interconnected heterogeneous information systems belonging to both government agencies and public and private sectors with a goal of modernizing the government's highly fragmented service-centric information infrastructure by improving information flow and the decision-making process (Joshi, Aref, Ghafoor, & Spafford, 2001a). The e-government environment also embeds the nation's critical infrastructures, that are required for providing the nation's basic services to the citizens (PDD, 1998), such as energy, telecommunications, banking and finance, and transportation facilities. The intricate connectivity of systems and their increasing dependence on IT dramatically magnifies the consequences of damages resulting from even simple system faults/accidents and intrusions, as well as natural events (fire, earthquakes, etc.), also collectively called *disruptions* (Ellison et al., 1997). A key challenge for such an infrastructure is to ensure continuous service availability to prevent financial losses, loss of prestige, endangerment of citizens' lives, and disturbances in national socio-psychological structures adversely effecting governance and democracy (Ellison et al., 1997; Gibbs, 1994; Moore, Ellison, & Linger, 2001). While it is essential that the e-Government infrastructure is resilient to disruptions, an even bigger concern is the protection of critical infrastructure components within the e-government. In essence, the e-government infrastructure should have the capability *to provide services in a timely manner, irrespective of disruptions*, a capability known as *survivability*.

## E-GOVERNMENT SYSTEMS SURVIVABILITY

The e-government survivability infrastructure should support both the intricate interdependence of government programs at different levels and between government and the private/public sectors, and address the need for continuity of its services in presence of disruptions. While such disruptions are inevitable in an e-government, key to its success lies on the effectiveness of mechanisms for detecting and responding intelligently to disruptions, which is a daunting challenge. Intelligent distributed capability is required to detect and counter both structured and unstructured disruptions that can be either in the form of intrusions or faults. Intrusions refer to the illegal access to a system by an intruder, whereas faults refer to the causes of physical failure of a system. Intrusions can be detected with the help of intrusion detection systems (IDS). IDSs report *anomalies* in behavior or recognize intrusion *signatures*. Faults can be detected but more importantly, methods for fault tolerance have to be implemented in the system. Fault tolerance is the ability of a system to withstand physical failure.

A survivability system needs to employ a combination of intrusion detection/prevention and fault tolerance methods. Separation between faults and intrusions, which have been studied separately, does not leverage the synergy existing between the two areas. This increases the overall cost of deploying measures against them, as well as the complexity of the overall system. Newly emerging coordinated, distributed intrusion detection techniques, coupled with data mining or stream mining tech-

*Table 1. Threats and their intent (Alexander et al., 1999)*

| Threat level | Actor | Intent |
|---|---|---|
| National security threats | Information Warrior (Cyber-soldier) | Reduce decision making capability at the national level, National chaos and psychological terror |
| | National intelligence (Cyber-spy) | Information leakage for political, military and economic advantages |
| Shared threats (government & Private sector) | Cyber-terrorist | Visibility/publicity, chaos, political changes |
| | Industrial espionage | Competitive advantage |
| | Organized crime (Cyber-crime) | Revenge, retribution, monetary gain, institutional/political change |
| Local Threats (Hacktivism) | Institutional hackers | Monetary gain, thrill/challenge, publicity/prestige |
| | Recreational hacker | Thrill, challenge |

niques show promise in improving the survivability capability of a large infrastructure like that of an e-Government system by facilitating real-time detection of and responding to disruptions.

## Disruption Categories for E-Government Systems

Disruptions to e-government services can be divided into two categories—*cyber disruptions* and *critical infrastructure disruptions*. Cyber-disruptions include cyber-terrorism, like NIMDA and the Code Red worms, and information warfare. Potential "*info weapons*" that can be used to launch an attack on an e-government include computer viruses, logic bombs, worms, Trojan horses, etc. (Alexander & Swetnam, 1999; Denning, 2001; Garfinkel & Spafford, 1997). Various attacks on systems include denial of service attack, virtual sit-ins and blockades, rootkits, etc. (Denning, 2001). The attacks using these malicious tools range from simple hacktivism, which refers to active hacking activities with the intent to disrupt normal operations but not causing serious damage, to the more damaging *cyber-terrorism* and *information warfare* (Alexander et al., 1999; Denning, 2001), which have become growing concerns post 9/11 era. Information warfare refers to the large-scale malicious activities launched by independent individuals or attackers hired by terrorists or belonging to rival countries. Cyber-terrorism is a more dangerous form of cyber-disruptions that can cause severe damage to the nation's systems (Denning, 2000). Even a simple, hour-long coordinated hacking activity that affects the country's air traffic system, a critical infrastructure, can have very drastic consequences for government operations. In a few years, the cyber-threats to the country is expected to be worse than the physical threat (Alexander et al., 1999).

*Critical infrastructure disruptions* could be some malicious attack, accident, or disaster causing critical infrastructure malfunction, which becomes a national concern. Protection of critical infrastructure is an important issue, because any disruption in their functioning would cause nation-wide chaos, for instance, the North-East Blackout of 2003 in the United States and Canada—a power failure over the Northeastern regions of the United States and Canada in 2003 that caused many systems dependent on the electrical grids to fail disastrously. The damage was estimated at almost U.S. $5 billion (Anderson et al., 2003).

Table 1 shows various threat levels and the criminal intent behind them (Alexander et al., 1999). At the highest level, we see national security threats, which are essentially aimed at the nation's critical infrastructures. Threats common to both government and non-government agencies include cyber-terrorism and e-espionage. Finally, there are frequently occurring hacking incidents that can create huge losses within an e-government environment. An alarming issue is the lack of awareness and ability to identify cyber-threats. Newer spamming and phishing attacks make survivability function more difficulty to implement (GAO, 2005).

At present, there is no nationally coordinated defense and survivability capability to detect and counter strategic and well-coordinated act of cyber-terrorism against the nation and to ensure the continuity of e-government services under cyber-siege. The U.S. National Infrastructure Protection Center (NIPC) is a program started by the Clinton administration in 1998 with an intention to maintain public and private sector infrastructure from disruptions of any sort and perform vulnerability checks regularly as preventive measures. Other nations such as Canada (PSEPC) and New Zealand have also taken to emergency preparedness and critical infrastructure protection. The Critical Infrastructure Protection project focuses on the impediments to the security and protection of the assets and addresses *public-private cyber-security cooperation, industry-academia consortium, knowledge management long-term high-risk cyber-security research.*

## AN ADAPTIVE E-GOVERNMENT INFRASTRUCTURE SURVIVABILITY FRAMEWORK AND ITS CHALLENGES

The key e-government survivability challenge is to synthesize a unified adaptive survivability framework (ASF)

*Figure 1. The adaptive survivability framework*

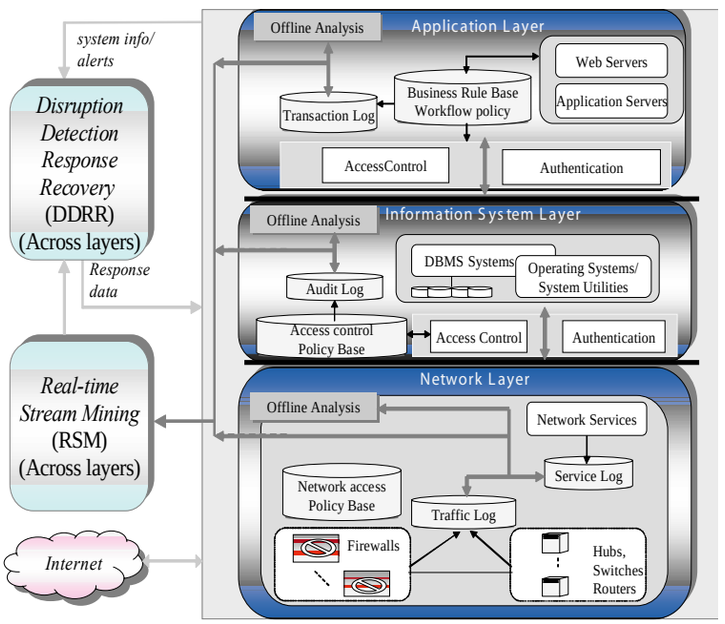
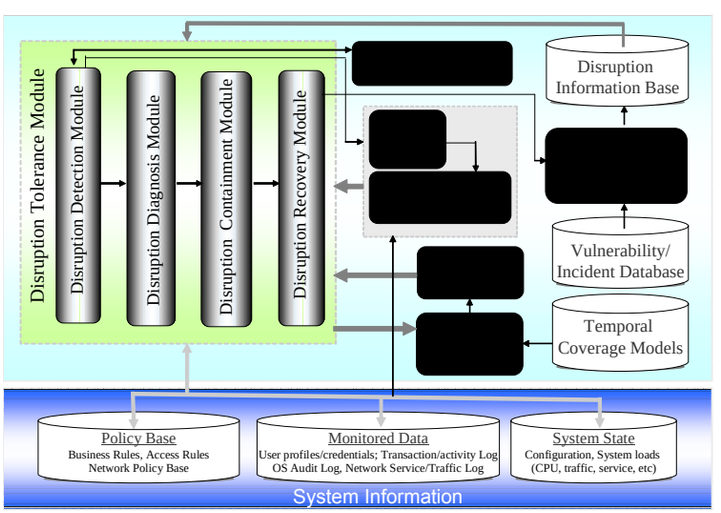



*Figure 2. The adaptive disruption detection, response, and recovery module*




by integrating the best of breed, synergistic techniques in the fields of vulnerability analysis, intrusion detection, containment and response, and fault tolerance. In particular, these techniques for network, system, or application layers need to collaboratively work to generate a survivability framework that provides the following capabilities:

1. Efficient diagnosis of disruption, pinpointing the cause and determining or predicting its impact on the system. The diagnosis should provide support for choosing the best possible mechanisms for timely prevention, control, and recovery from a single, or multiple concurrent disruptions

2. Isolation of the effect of an impending or ongoing disruption, facilitating quick recovery and high availability of system functionality while the system is being disrupted
3. Utilization of prior knowledge in adapting to faster, more effective and economical methods of disruption tolerance. Adaptation also occurs in response to unpredictable environmental conditions

In this section, we present such an ASF for a generic system. A nation-wide extension of its key functionality is crucial to create an overall coordinated e-government survivability capability. The key component of the ASF is the adaptive, disruption detection, response, and recovery ($AD^2R^2$) module, (see Figure 2) which is responsible for correlating the events across the three architectural layers to efficiently detect the disruptions in the system and respond to them.

The three layer architecture captures a general separation of components within an application environment and include information resources (databases, files), utilities (SSH, Web service, FTP), computational resources (CPUs), and communication links (betwork card, routers, switches, etc.) organized at different layers. These components interact with each other to perform various activities, represented as transactions or events. Figure 2 depicts the functional architecture of the $AD^2R^2$. The thick arrows indicate the information exchange between each module, whereas the thin arrows indicate inter-module information exchange. The disruption detection module (DDM) analyzes system data to identify ongoing/impending disruptions with the assistance of the disruption classifier module (DCM). A set of predictive parameters are used by the disruption diagnosis module (DDiaM) to construct the containment boundary around components that have been affected by disruption. The disruption recovery module (DRM) is responsible for response and recovery actions. The coverage computation module (CCM) computes coverage for each of the four phases, and thus facilitates the determination of the efficiency and efficacy of the individual modules as well as the entire system.

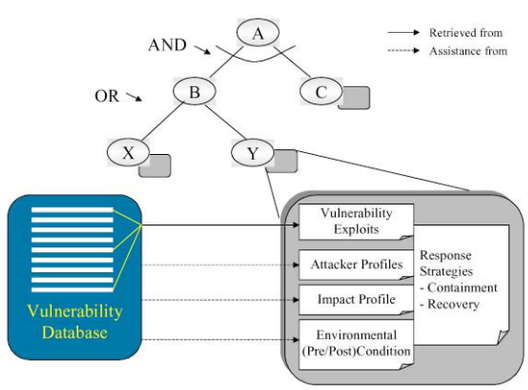
## Disruptive Information Base

A key challenge for the ASF entails the identification of taxonomic features of general classes of disruptions and representing them efficiently, in a disruption information base (DIB). Various publicly available databases related to security vulnerabilities and incidents, such as those maintained by the US-CERT, CERIAS-VD (Meunier & Spafford, 2002; Song, Mandujano, & Meunier et al., 2000), and BUGTRAQ, are available that contain volumes of vulnerability information that needs to be properly used to generate a knowledge base of disruptions. These databases provide important information related to known software vulnerabilities, such as the impact of the exploitation of a flaw, the types of objects that are directly or indirectly affected by the exploitation, and the fixes that are available. Existing characterization of attacks and intrusions are ad-hoc, unstructured and restricted. For example, a denial of service attack does help us to understand the nature of the attack, however, what impacts it has on different parts of the target system is vague. Furthermore, a unified classification of faults and intrusions is needed.

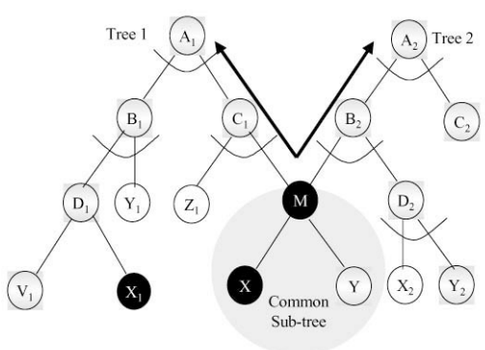
A promising approach is the representation of the disruption classes using AND-OR trees (Schneier, 2000). The root of a disruption tree represents an ultimate attack goal or a major system failure and its children represent different disruptions that must collectively (*AND*-decomposition) or alternatively (*OR*-decomposition) occur for the major disruption to occur. For example, Figure 3(a)

*Figure 3. A disruption tree (a) with associated information (b) with a common sub-tree*

*a.*




*b.*



depicts a simple attack tree for attack type A. The model can be expanded to include two key parameters that are associated with each node in the disruption tree, and are computed by the parameter computation module (PCM):

- $P_s(d|D)$—Probability of occurrence of disruption $d$ given the occurrence of disruptions $D$
- $T_m(d|D)$—Propagation time of $d$ given the occurrence disruptions $D$

Computation of $P_s$ and $T_m$ is based on monitored real-time data. The trees need also be augmented with the following information: (1) system vulnerabilities, (2) attacker profile, (3) system state, (4) impact profile, and (5) response strategies. In particular, a crucial issue is an efficient modeling of attacks and attackers, which is the function of the attacker profiler module, to capture attack objectives and strategies. Determining efficient and cost-effective countermeasure against a disruption will depend on the $P_s$ and $T_m$ values associated with the disruption node and the cost the response strategies. In scenarios where two disruption trees have a common node, (e.g., node M in Figure 3(b)), choosing the response strategy will involve more complicated decision-making. For a robust ASF, it is crucial that the DIB contain detailed information about response strategies for each disruption class.

Most existing classification schemes focus primarily on classifying security vulnerabilities. Attacker modeling has been addressed in (Avizienis, Laprie, Randell, & Landwehr, 2004; Bagchi et al, 2000; Ellison et al., 1997; Moore et al., 2001), but no formal model has been proposed. Some model checking approaches have been used to generate attack/fault trees (Moore et al., 2001; Schneier, 2000). However, these models rely on exhaustive knowledge of system states and have serious complexity problems.

## Adaptive Disruption Detection, Response, and Recovery

Development of a real-time collaborative disruption detection framework that analyzes monitored data and the disruption trees is another significant challenge for an ASF. Multiple detectors should be employed at different architectural levels and their results correlated to detect disruptions accurately. Traditional intrusion detection techniques lack real-time capabilities essential for timely response in emerging systems because of the need to analyze a huge amount of log data. In such a case disruption, management requires real-time continuous monitoring and intelligent analysis of event data streams to detect impending/ongoing disruptions.

### Real-Time Mining of Transactional Audit Trail for Disruption Detection

Stream mining, a newly emerging data analysis and mining paradigm, encompasses mining potentially infinite amount of continuously arriving data at a variable rate. Mining event data streams poses many new challenges as such streams differ substantially from traditional data. While traditional databases assume that exact mining results can always be obtained as data elements are synchronized, streams data is often lost, stale, or intentionally omitted for processing reasons and so mining results must be computed with incomplete information. Furthermore, traditional databases assume that applications require no real-time services whereas event data streams are real-time by nature. Therefore, the challenging task of mining such streams is to develop online incremental data mining techniques that operate on incomplete data, or alternatively, data summaries, yet that can obtain "good" results. Research in mining data can significantly enhance real-time detection.

### Disruption Diagnosis and Containment

The goal of the DDiaM is to identify and enforce a *disruption containment boundary* (DCB) so as to prevent the propagation of disruptions. Once the DDiaM identifies that one or more of the sub-goals in the disruption sub tree have been achieved, it queries the DIB to determine the propagation time for a higher-level goal and the post-condition of the particular phase of the disruption to construct the DCB. DCBs may be composed of services, a node, a layer within a node, a component/sub-component within a layer. The diagnosis will also obtain the latency of the detection mechanism that triggered the diagnosis phase.

### Response and Recovery

This phase recovers the system from the effect of the disruption and/or initiates counter-measures, and prevents future disruptions. Response may involve downgrading the trust level of the system. Vulnerability prevention in an automated manner is difficult. The recovery infrastructure also provides feedback to the disruption tree. If the suggested recovery from the current DIB is not successful, alternate recovery strategies are attempted and the node in the disruption tree is re-labeled with the successful recovery strategy. A key challenge is handling multiple simultaneous disruptions as it requires analyzing the dependencies among different disruption classes.

### Cost-Based Adaptability and Coverage Computation

Another key challenge is the development of various cost-based recovery strategies that can be used to recover the system's normal or good state after a system disruption has been detected. These techniques will aim to achieve an acceptable level of survivability in presence of ongoing disruptions. It is crucial to develop cost-based models for adaptively guiding the response to system disruptions, based on risk analysis. The CC module computes coverage for each of the four phases facilitating the determination of the efficiency and effectiveness of the different modules. The CC module needs to be augmented by cost-based models to adaptively guide the response capability of the system. The key challenge is ensuring that acceptable values of key metrics such as survivability are achieved at the desired cost.

Several IDSs exist in the literature, such as in (Habib, Hafeeda, & Bhargava, 2002; Kerschbaum, Spafford, & Zamboni, 2000; Kumar & Spafford, 1994; Reynolds et al., 2002). Some work on isolation of sub-systems targeted by attacks through cutting the connections to them has been shown in (Reynolds et al., 2002). There have been several systems that provide adaptive fault tolerance in distributed systems through a middleware layer. Chameleon (Kalbarczyk, Iyer, Bagchi, & Whisnant, 1999) and AQuA (Ren et al., 2003) are two recent examples that focus on tolerating different classes of faults. Some existing adaptive intrusion detection systems include (Hinton, Cowan, Delcambre, & Bowers, 1999; Ragsdale, Carver, Humphries, & Pooch, 2000).

## CONCLUSION

In this article, we have presented the e-government infrastructure survivability challenges and motivated that the success of an e-government system is dependent on how resilient it is to the continuous onslaught of intrusions and faults, as any disruption can have severe impact on national security and effective governance. It is crucial that an e-government system has a coordinated, adaptive capability to analyze, diagnose, and timely respond to impending/ongoing infrastructural disruptions. We have presented an adaptive survivability framework for a generic system that integrates the synergy among different technologies to synthesize coordinated and efficient defense capability. Such a framework needs to be implemented to create a dependable, secure, and survivable e-government infrastructure.

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## KEY TERMS

**Critical Infrastructure:** An infrastructure containing systems, assets, and services which a country's economy and society depend on.

**Disruption Containment:** Controlling the propagation of the effects of a disruption to other parts of the system.

**Disruption Signature:** A sequence of events by which a disruption can be recognized.

**Disruption:** A system failure or intrusion that prevents the normal operation of a system.

**Intrusion Detection Systems:** Systems that can identify ongoing/impending system intrusions by recognizing intrusion signatures or anomalous system activities.

**Stream Mining:** An emerging data analysis and mining paradigm that can be applied to potentially infinite amounts of continuously arriving variable rate, real-time, asynchronous event data streams.

**Survivability:** The ability of a system to maintain its functionality even when disruptions occur.

# Tax Proposal Service of the Finnish Tax Authority

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## INTRODUCTION

Taxation is one of the key functions of any state. Without a working tax collection system, any state would have big difficulties in fulfilling its responsibilities. Even though taxation is a service with negative demand (Kotler, 1997) at an individual level, most taxpayers admit that taxation needs to be done. As an unpleasant issue, it should be taken care of as efficiently and with as little effort as possible needed from the taxpayer's side.

Our article, as well as the tax proposal system to be introduced, focuses solely on the personal income tax. The idea of the tax proposal system is to take away the hard work from the taxpayer: He or she does not have to work out anything for the taxation purposes in the normal case. The taxpayer's role is rather to accept the taxation information and decision that is given to him or her, or to demand changes to the taxation. In that case, he or she has to deliver the evidence. In the long run, the Web-based interfaces are too on the Finnish tax-authority's (shortly referred to as taxman in the rest of this article) development list.

Taxation is a very information intensive activity. It needs the support of huge information and other systems. Introducing changes to this environment, which is also heavily regulated, is a demanding task. Yet the efficiency and effectiveness of the taxation system is a key success factor for any state, and innovations are needed in a constantly changing environment.

As many countries try to create Web-based tax return arrangements (Vassilagis, Laskaridis, Lepouras, Rouvas, & Georgiadis, 2003), Finland has chosen another strategy to streamline the taxation process. In Finland, the interface to the final taxpayer, to the individual, remains so far paper-based, but massive system integration between the systems of the tax authority and the various payers of salaries and other income to the final taxpayer has been established.

In this article, we tell how the Finnish tax proposal system works, how tax authorities have been able to develop and introduce the tax proposal system, and what kind of benefits it has brought to the taxman and to the taxpayers.

We represent that the tight information system integration in one governmental agency does not give competitive advantage. The integration has to go much deeper and wider into intergovernmental networks (G2G) and government to business networks (G2B) (Scholl, 2004).

Our main conclusions are:

- Citizen-oriented process design and system development can give efficiency and effectiveness benefits for administration too. The Finnish approach of first streamlining the taxation processes and regulation and then later giving electronic access to the taxpayer to the taxation data is sensible.
- To get the systems automated and processed streamlined, has meant that the very structure, process and basis of taxation has been changed in some details. A Finnish success factor has been that political decision makers have let this happen.
- The Finnish approach has been possible because of a wide nationwide consensus and co-operation. The selected approach has benefited from the trust the taxman and other authorities enjoys in the society. The new system further strengthens the goodwill of the taxman among taxpayers. There is a positive interaction going on.
- Adam Smith's over 200 years old principles of good taxation are easily implemented with computerized taxation methods.
- The massive system integration effort on the background has cost a lot, not just to the taxman but to the employers and many other parties too. However, all parties have seen the increased efficiency of taxation worth the investments.
- Information systems with clear strategic advantage take years if not decades to mature. This has too been the case with the Finnish taxation system.

*Table 1. Less corrupted countries (Transparency International, 2005)*

| Rank | Country |
|---|---|
| 1. | Finland |
| 2. | New Zealand |
| 3. | Denmark<br>Iceland |
| 5. | Singapore |
| 6. | Sweden |
| 7. | Switzerland |

*Table 2. Readiness to utilize ICT in different countries (Soumitra & Amit, 2004)*

| Rank | Country |
|---|---|
| 1. | United States |
| 2. | Singapore |
| 3. | Finland |
| 4. | Sweden |
| 5. | Denmark |
| 6. | Canada |
| 7. | Switzerland |
| 8. | Norway |
| 9 | Australia |
| 10. | Iceland |

## BACKGROUND

Finland has been number one in the list of less corrupted countries for years. In Table 1, countries which are less corrupted are listed. Citizens trust the Finnish public administration in general and the authorities have understood that trust generation and maintenance demands an ongoing process which has to be catered for (OECD, 2003).

The trust towards authorities in general and the taxman in particular has been a key success factor in Finland. Citizens can be sure that everyone is taxed on the same basis of rules and that the paid money will go to the intended recipients. The outcome of taxation is public, and anyone's paid taxes and the key figures leading to the taxation are public data that can be accessed by anyone. As compared to many countries with federal structures, Finland has it easy: there is just one taxation basis. In addition, citizens and companies conform to laws relative literally. The size gives some flexibility too: in Finland there are only 5.3 million inhabitants.

Finland has also performed well in the lists comparing ICT infrastructures in different countries, as presented in Table 2.

Table 2 is based on relatively gross data on some basic network technologies. Deeper in the background is the fact that Finland is a cashless society, where all parties are used to electronic money transfers. These always leave behind the documentation needed even for the taxation purposes. At a concrete system level, employers are, for example, used to EDI-type and later Web-based connections to banks and have the needed expertise and infrastructure. It has not been a big step to adapt the same resources to connections to the systems of the taxman. The well-functioning Finnish banking network is a cornerstone for the tax-related money traffic (Kallio, Mallat, Riipinen, & Tinnilä, 2005). Currently all taxation related money transfers are made by electronic account transactions.

The system we discuss here is a result of a long development. If we take a historical perspective, Finland has been able to collect the best parts (and maybe some of the worst too) of the administrative systems of both the Swedish and Russian empires, as Finland has been a part of both empires before the independence gained in 1917.

Another part of the development is evolution of information systems. Already as early as 1947 the first punch card-based computers were installed to the Finnish tax authority premises. In the 1980s a real investment boom occurred, and ICT investments in the Finnish taxation grew 18-fold in the period between 1980 and 1987 (Lehtinen, 1995).

One essential issue to develop taxation systems is the Finnish labor market system and the large-scale cooperation within it. Government has traditionally taken part in the income settlement negotiations which are not focused on wage issues only. Taxation and developments in working life have also been topics for many years.

In Finland, labor union membership fee is directly deducted from wage of the labour union members[1] by the employer and employees can deduct the fee from the taxes. The clearance of these union membership payments has then been sent to labor union and to the tax authority. Again here we have detail that has been contributing to the system integration built.

What anyway is maybe the most important development is the system integration between the different taxation interest groups. Those are banks, employers, private pension institutes and other government agencies (especially Population Register Centre, National Board of Patents and Registration and Social Insurance Institution).

## CHARACTERISTICS OF GOOD TAXATION

Adam Smith (1723-1790) was one of the first to pay attention to good taxation principles. His recommendations for good taxation still hold today (Smith, 1993):

- **Equity:** Every subject of the state ought to contribute towards the support of the government, as

nearly as possible, in proportion to their abilities; that is, in proportion to the revenue which they enjoy under the protection of the state.

- **Certainty:** The tax which every individual is bound to pay ought to be certain, and not arbitrary. The time of payment, the manner of payment, the amount to be paid, ought all to be clear and plain to the contributor, and to every other person.
- **Convenience:** Every tax ought to be levied at the time, or in the manner, in which it is most likely to be convenient for the contributor to pay it.
- **Economy:** Every tax ought to be so contrived as both to take out and to keep out of the pockets of the people as little as possible, over and above what it brings into the public treasury of the state.

## THE FINNISH TAX PROPOSAL MODEL

The functioning of the Finnish tax system is described in Figure 1.

The basis of the system is that the employer collects the income tax directly from the salary, and the employee just gets to his or her bank account the net income, also the income without taxes.

On the basis of the earlier income and many other factors every citizen is given an individual tax-withholding rate that the employer uses for the tax-collecting purposes. This system is psychologically easy to accept: you as a taxpayer in principle never owe to the taxman.

The tax money collected by the employer goes monthly to the tax authority with a notification. Whether or not this happens orderly is not a headache of the employee, the final taxpayer. In addition and for security purposes employers make a yearly notification.

In Finland there are two electronic possibilities to send statutory employees' notifications. Big and medium size companies have sent their wage and collected tax information mainly through XML-based broker systems that are integrated into the TYVI application. For firms with 1-5 employees a new Web-based system Palkka was published in 2005. The electronic notifications carried by these systems are called Employees' e-notifications.

The tax authority forwards the collected tax to the tax recipients, also state, municipalities, parish, and Social Insurance Institution.

The hard part of the system is the collection of data from other sources. Citizens, for example, collect incomes from capital investments, and enjoy many different taxable social benefits. The taxation system too allows citizens to draw reductions on taxes. The most important reduction is interest of the mortgage. Information on all these issues should be collected in order to make the tax proposal exact.

After processing all this information, the tax authority yearly, in May, sends the tax proposal to the taxpayers. This comes in as classical mail. The tax proposal contains a comprehensive and detailed list of the taxpayer's income, reductions on tax, paid taxes and other relevant data connected to taxation, and a final

*Figure 1. The Finnish Tax proposal flow of activities*

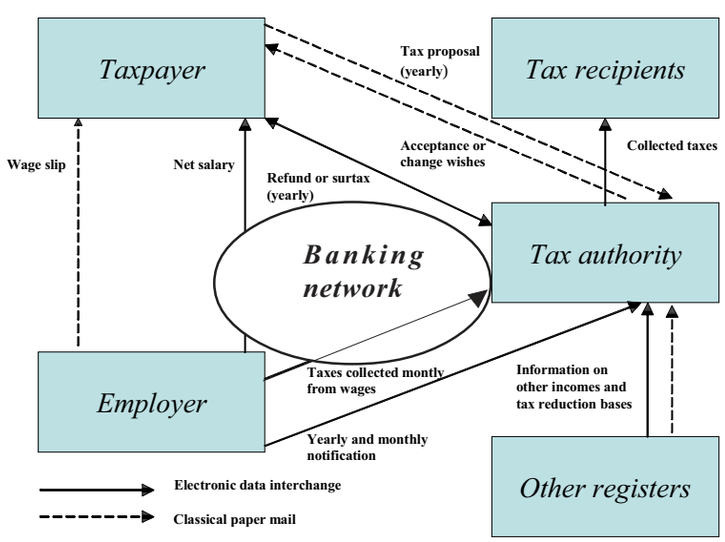

*Table 3. Some statistics about Finnish personal taxation (National Board of Taxes, 2003, 2004)*

| Year | Taxman's Used Person-Years | Cost of Personal Taxation for the State | Number of Tax Proposals Sent | Tax Proposals of Total Personal Taxation Cases | Returned Tax Proposals of Sent Tax Proposals | Number of Employees' E-Notifications Received by Taxman |
|---|---|---|---|---|---|---|
| 2000 | 6, 265 | 95 M• | 3, 002, 000 | 70 % | 25 % | 540, 000 |
| 2001 | 6, 270 | 102 M• | 3, 037, 000 | 70 % | 26 % | 725, 000 |
| 2002 | 6, 323 | 112 M• | 3, 094, 000 | 70 % | 24 % | 1, 420, 000 |
| 2003 | 6, 297 | 109 M• | 3, 127, 000 | 70 % | 24 % | 1, 980, 000 |
| 2004 | 6, 300 | 110 M• | 3, 140, 000 | 71 % | 25 % | 3, 136, 573 |

calculation based on those. If the taxpayer accepts the tax proposal, he or she does not have to do anything. If he or she wants something to be changed, he or she can apply for that. Currently 70% of all tax returns are made with tax proposal method. Only one quarter of tax proposals were returned to the tax authority.

Depending on the final outcome, the taxpayer will get the tax refund back to his or her bank account later or will get a bill on the unpaid part of the taxes (surtax)[2]. The goal of the taxman is to minimize these transactions, and often they are not needed at all. The tax collection mechanism is quite accurate: average tax refund was 450 • and surtax 930 • in 2003. The net effect of this is only 2.1% of wage earners total taxes (National Board of Taxes, 2003).

Taxes are collected very efficiently in Finland. The costs of collecting one Euro of personal income taxes costs just 1.43 cents for the taxman (National Board of Taxes, 2004).

In Table 3, we have some information on the Finnish taxation system key figures in years 2000-2004 in the field of personal taxation. As can be seen, the amount of used man-years has remained quite constant. Costs have anyway risen partly because of investments in information systems. During this period, the tax proposal system has been established, and no further coverage was aimed at, because the system had to be tested and fully integrated. For the taxation of year 2005, a full 100% coverage is aimed at. This means for example that taxpayers with entrepreneur income will be included to the system. As can be seen from the table, during the period 2000-2005 employers have taken into use electronic systems for delivering employee notifications to the tax authorities, their amount is more than fivefold in year 2005 as compared to year 2000.

There is a principal discussion whether the taxpayer should anyway sign the tax proposal and return it, or not. Currently this is not demanded if no changes are demanded by the taxpayer, but demanding a signature would put the taxpayer more in charge of the issue, and would stress that it is at the very end also his/her responsibility that the taxation is right performed.

## CONCLUSION

If you automate a messy system, you get an automated mess. The Finnish government has given a lot of priority to the streamlining of the taxation processes. Taxation data must first be brought to a high quality level. Giving Web-based access to deficient data would just add to confusion and extra work.

To get the systems automated and processed streamlined, has meant that the very structure of taxation has been changed in some details. A Finnish success factor has been that political decision makers have let this happen. The ministry of Finance has been able to keep the needed development process on the right track, even though different political ambitions regarding taxation have emerged now and then.

The taxation system is a very visible and concrete part of public administration for the citizens. If it is performing well the citizens' general acceptance of and respect for the public administration is increased. The selected approach has benefited from the trust the taxman enjoys in the society, and the new system further strengthens the goodwill of the taxman among taxpayers. There is a positive interaction going on. Citizens find taxation-related tasks a nuisance, and are happy to get rid of them. This can of course just happen in an environment where the citizen can be sure that the taxman is not trying and going to betray him or her is some way. A part of this is that the mistakes even negative to the tax collector are too automatically corrected.

The massive system integration effort on the background has cost a lot, not just to the taxman but to the employers and many other parties too. However, all parties have seen the increased efficiency of taxation worth the investments. The most costly way would be having everything on just papers, and coming back to the issues again and again because of deficient information flows. This situation of the time before computers is something no one wants to return to.

Information systems with clear strategic advantage take years if not decades to mature. The Finnish tax-

proposal system has been constructed over decades, and small but planned steps have finally allowed the current level of sophistication.

We can take a look at the system evaluating it on the basis of the recommendations by Adam Smith presented above. Our conclusions here are:

- **Equity:** The goal of bringing 100% of citizens to this system will make citizens very equal. Every wage earner will be handled with the same rules by the system.
- **Certainty:** The tax proposal system will increase certainty as everything is verified against different registers.
- **Convenience:** The system is very easy for the taxpayer. In the best case, he/she has to do nothing.
- **Economy:** When fully operating the system should reduce errors and double work efficiently, and so contribute to the economy of taxation.

The Finnish tax proposal case proves which benefits can be achieved when having tight BtoG and GtoG integration. It shows too how citizen can utilize e-taxation without a Web-based tax return system.

## FUTURE TRENDS

The Finnish income tax system is not ready. Certain goals for the future system are already published; some are still at an idea phase. The goal for the taxation on year 2005 is to expand the coverage of the tax proposal to cover the whole of the population. To obtain this, reporting on occasional incomes and rights for tax reductions to the systems must still be developed. Same tax legislation has to be chanced in order to be corresponded with new process.

The tax process innovations haven't decreased dramatically the amount of tax personal. The Finnish tax authority's aim is achieve 5 000 employees level by year 2012.

The vision of the future is a tax-account, like the one we have in banks. Citizens, as well as the tax authority, would have real-time on-line accounting of due and paid taxes, and a balance would be visible all the time. Taxpayers could arrange their payment schedules themselves and inform themselves of their tax account status all the time through Internet. A prerequisite for this would be good working systems for citizen identification on the net, say through an ID-card. A lot of further system integration work is needed on the tax authority's side, as well as issues with re-engineering process, tax legislation, and organization.

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## KEY TERMS

**Employees' Notification:** Employers deliver information of paid taxes and wages at individual employee level. Employee identification is made with a personal ID code. Electronic declarations are forwarded by TYVI or Palkka systems and they are called Employees' e-notifications. In Finland these notifications are made on a monthly and yearly basis.

**Government to Business (G2B):** Rationalizes exchange of information and transactions between government and business, the government being the more active part. G2B is also referred to with acronyms g2b or GtoB.

**Government to Government (G2G):** Inter- and intra-governmental transactional and informational system integration. The aim is to create new services and rationalize governmental processes. G2G is also referred to with acronyms g2g or GtoG

**Palkka:** Payroll and statutory declaration system for small size employers. Employers with 1-5 employees can pay their wage, tax, insurance, and pension payments with the system. In the same way they can make the declarations. The service is free. A Web-based application.

**Tax Proposal:** Precomplemented citizen's tax declaration delivered by the tax authority.

**TYVI:** Statutory authorities' declaration system for big and medium size employers. Provides companies with an electronic channel for making statutory declarations to authorities, insurance, and pension companies. The information transfer is based on XML-technology. Most of Finnish payroll applications are integrated into it.

**Extensible Markup Language (XML):** A computer language, designed to improve the functionality of the Web by providing more flexible and adaptable information identification. XML is a formal specification of the World Wide Web Consortium.

## ENDNOTES

1 Labor union membership is voluntary in Finland, but the membership rate is very high in most professions.

2 It might be worth noting that in Finland, every citizen and company has a clear identity marked with unique identification code. This is even given to foreigners having a permanent stay in Finland. Further, citizens have no difficulties in having a bank account and giving its number to the tax authorities. Every citizen too has a permanent address. These conditions might not be available in all countries.

# Technological Innovation in Public Organizations through Digital Government

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## INTRODUCTION

The rapid adoption of computer networks, such as the Internet and the World Wide Web (WWW), within various segments of society has spurred an increased interest in using such technologies to enhance the performance of organizations in both the public and private sectors. While private sector organizations now commonly employ electronic commerce, or e-commerce, strategies to either augment existing business activities or cultivate new groups of customers, organizations at all levels of government have also begun to pay renewed attention to the prospects of using new forms of *information and communication technology* (ICT) in order to improve the production and delivery of services. As with many technologies, the increased use of ICT by government was in response not only to the increased use of ICT by government stakeholders, such as citizens or businesses, but also in response to a growing call for governmental reform during the 1990s. As public organizations at the federal, state, and even local level began to initiate organizational reforms that sought to bring private sector norms to government, they often sought to employ ICT as means to increase efficiencies and organizational coordination (Gore, 1998; Osborne & Gaebler, 1993). Such attempts to reform the operations of public organizations were a key factor in promoting an increased interest in use of new forms of ICT (Fountain, 2001). This growing focus on the broader use of ICT by public organizations came to be known as *digital government*.

The term, *digital government,* grew to mean the development, adoption, and use of ICT within a public organization's internal information systems, as well as the use of ICT to enhance an organization's interaction with external stakeholders such as private-sector vendors, interest groups, or individual citizens. Some scholars more specifically characterize this broader use of ICT by public organizations according to its intended purpose. Electronic government, or *e-government,* has often been used to describe the use of ICT by public organizations to provide programmatic information or services to citizens and other stakeholders (Watson & Mundy, 2001). For example, providing an online method through which citizens could conduct financial transactions, such as tax or license payments, would be a typical e-government activity. Other uses of ICT include the promotion of various types of political activity and are often described as electronic politics, or *e-politics*. These types of ICT-based activities are often characterized as those that may influence citizens' knowledge of, or participation in, the political processes. For instance, the ability of an elected body of government, such as a state legislature, to put information about proposed legislation online for public comment or to actually allow citizens to contact members of the legislature directly would be a simple example of e-politics.

However, ICT is not a panacea for every organizational challenge. ICT can introduce additional challenges to the organization. For example, the increased attention on employing ICT to achieve agency goals has also brought to the forefront the potential difficulty in successfully developing large-scale ICT systems within U.S. government agencies. For example, the Federal Bureau of Investigation's (FBI) recent announcement that it may have to scrap its project to develop a Virtual Case File system that was estimated to cost $170 million (Freiden, 2005). The adoption of new ICT is often marked by setbacks or failures to meet expected project goals, and this characteristic is certainly not limited to public organizations. However, adherence to public sector norms of openness and transparency often means that when significant problems do occur, they happen within view of the public. More significantly, such examples highlight the difficulty of managing the development and adoption of large-scale ICT systems within the public sector. However conceptualized or defined, the development, adoption, and use of ICT by public organizations is a phenomena oriented around the use of technology with the intended purpose of initiating change in an organization's technical and social structure. Since the development and

adoption of new ICT, or new ways of employing existing ICT, are necessarily concerned with employing new technologies or social practices to accomplish an organizational goal, they meet the basic definition of technological innovations (Rogers, 1995; Tornatsky & Fleischer, 1990). If public organizations are to improve their ability to adopt and implement new ICT, they should better understand the lessons and issues highlighted by a broader literature concerning technological innovation.

## TECHNOLOGICAL INNOVATION AS A THEORETICAL FOUNDATION FOR DIGITAL GOVERNMENT

Since the adoption and use of ICT by public organizations can be considered a form of technological innovation, studies examining various aspects of the development, adoption, and eventual routinization of new technologies may illuminate the social and technological factors that influence digital government initiatives and strategies. Researchers often describe technological innovation in terms of loose overlapping stages or steps. Some conceptualizations of the innovation process include up to five progressive stages: awareness, matching, adoption, implementation, and routinization (Tornatsky & Fleisher, 1990). Other researchers have collapsed these five stages into just two broad phases, initiation and implementation, because each of the two stages is influenced by different factors (Damanpour, 1991). The initiation stage includes activities such as problem perception, information search, attitude formation, and the attainment of resources. Implementation includes activities such as modification of the technology or practice, the adjustment of necessary organizational practices or operations, early use and more routine use of the innovation. Regardless of the actual number of stages in the innovation process, it is important to note that the process may, or may not, occur in a linear fashion, and all innovations may not experience each stage. In fact, some research specifically highlights the occurrence of setbacks, and even reversals, with regards to the innovation process (Rogers & Agarwala-Rogers, 1976; Tornatzky &Fleischer, 1990).

While the broader process of technological innovation is often described in terms of stages, the interaction of the actual technology with the social and technical factors of the organization plays an important role in how the innovation will progress. A technology's particular characteristics strongly influence whether or not a particular technology will be adopted and implemented by a particular organization. While studies of innovation have examined numerous technologies, relative advantage, ease-of-use, and compatibility of the respective technology seem to be repeatedly linked to whether or not a particular technology will be adopted by an organization (Tornatzky & Klein, 1982). The extent to which a particular technology alters current organizational processes or outputs also plays a key role in the innovation process. So-called, radical innovations usually involve a major transformation of an organization's processes or outputs, and/or significantly impact the organization's key stakeholders (Dewar & Dutton, 1986; Ettlie, Bridges, & O'Keefe, 1984). Radical innovations are clear departures from an organization's technological norms and, therefore, generally experience more risks for failure or setbacks than do technological innovations that involve only slight changes in an organization's current technological environment.

Several key types of organizational factors seem to influence the process of technological innovation. These include awareness or knowledge of the innovation, available resources, ties to the external environment, and organizational structure (Rogers & Agarwala-Rogers, 1976). During the initial stages of the innovation process, the organization must detect some need to use a new technology to alter organizational processes and performance, and must be aware of the potential advantage of employing a particular technology. This awareness may come in the form of personnel within the organization or from external experts, but the organization must be able to both detect the need to undergo technologically grounded change and match that need to a new technology that already exists or will be developed. Once the need for a technological innovation exists, the organization must then have enough resources to acquire the technology and integrate it into organizational processes. Resources may come in the form of expertise already possessed by an organization's personnel, existing technologies and technical infrastructure, or the financial assets required to attain such resources from outside the organization itself.

In addition to the role of knowledge and resources, an organization's structural arrangements can also play an important role in successfully adopting and developing new technologies. For instance, organizations with high levels of structural complexity, less formalization, and low centralization tend to adopt more technological innovations than do organizations with high levels of formalization and more centralized structural characteristics (Damanpour, 1991; Duncan, 1976). This does not mean, however, that such factors automatically promote the successful implementation of new technologies, since in some situations successful implementation often requires the resources and support of key organizational personnel, such as senior managers. Such support and attention might be available more readily in organizations with more formal and centralized organizational structures because senior managers may play a more central, and visible, role

in supporting organizational initiatives (Rogers & Rogers-Agarwala, 1976; Wilson, 1989).

Closely tied to the issue of organizational structure is how closely the organization is tied to its external environment. An organization that is tied closely to its external environment through legal or market mechanisms may more readily perceive performance shortfalls and, therefore, have a heightened awareness for the need for technological innovations. In addition, such ties to the external environment may also facilitate awareness of new technologies that may be applied in an attempt to implement technologically based change. Furthermore, organizations that have relatively porous boundaries with their external environment, and which are accountable to stakeholders within that environment, will be more likely to be innovative than organizations with more stringent boundaries. Organizations will, in fact, attempt not only to adapt to meet demands emanating from its external environment, but to control them (Thompson, 2004).

Taking these broad points into consideration, an organization's ability to successfully adopt, implement, and use new forms of technological innovations, such as ICT, seems to be an interactive result of various socio-technical factors arising from the technology, resources, organizational structure, and ties to the external environment. It is important to note that technological innovation is not an inevitable process that must take place or that must successfully move through a progression. An organization may never initiate the innovation process or the innovation may end at any one of the stages. Furthermore, it is important to understand that organizations may not make decisions in a hyper-rational manner during the innovation process. They act within a form of bounded rationality that results from limits in information about the innovation process and their ability to process what information is available (March & Simon, 1958; Simon, 1976).

## APPLYING KNOWLEDGE OF TECHNOLOGICAL INNOVATION TO STRATEGIES OF DIGITAL GOVERNMENT

Studies of technological innovation have already led to more specific theories of innovation that focus on the acceptance of ICT by individual users. For instance, the Perceived Characteristics of Innovating (PCI) draws upon Rogers' theory of innovation diffusion (1995) to develop a means to evaluate an adopter's perception of ICT (Moore & Benbasat, 1991). The research on technological innovation covers a broad group of specific technologies and an array of socio-technical factors that influence the innovation process. An evaluation of the literature highlights some important factors to consider with regards to the adoption, development, and implementation of ICT within public organizations. It is apparent that public organizations must consider the characteristics of the specific ICT, as well as factors such as knowledge, resources, structural arrangements, and the external environment.

## Characteristics of Digital Government ICT

With regards to digital government, the characteristics of the actual ICT play a significant role in the progression of the innovation process. While the use of Internet-based technologies, such as hypertext markup languages (HTML), extensible markup language (XML), browser software, and even wireless networks are now almost ubiquitous characteristics of modern computing, the broader configurations of such technologies occur in a variety of ways, depending on the respective objective or task. For example, essentially the same basic component technologies can be used to develop an intranet for communication and data processing within an organization's environment or can be constructed to disseminate information to stakeholders external to the organization through some form of extranet. While there have been a steady stream of new technologies that facilitate the technical systems development inherent in using ICT to accomplish organizational tasks, the degree to which such technologies are significantly different from preexisting information systems, or the way in which such systems are used, may play a significant role in how such innovations are perceived and adopted within public organizations. ICT applications that are clear departures from an organization's existing ICT infrastructure or that seek to accomplish core tasks in different ways may experience more difficulty and resistance during the innovation process. For example, many public organizations have adopted Enterprise Resource Planning (ERP) systems that were originally designed as modular software systems intended to improve the administration of business functions, such as budgeting, procurement, and human resources. The software modules are connected to a common database that is used to centralize information and improve organizational decision-making (Sawyer & Southwick, 2002). The awareness and adoption of such systems has been quite popular among public organizations at all levels of government, however many implementations have experienced significant difficulties because such systems are departures from existing ICT systems and are often difficult to integrate within preexisting business procedures and norms (Sawyer & Tapia, 2002).

## Knowledge of ICT

The extent to which an organization is aware of how new ICT may be applied to accomplish organizational goals is an important factor in the initiation of the innovation process. As mentioned previously, digital government in its broadest sense is not a new phenomenon. Public organizations have been using ICT for many years in order to carry out key tasks, such as data processing. The extent to which organizational actors, such as managers or technical experts, seek out new ICT in order to achieve goals is an important contributing factor to the innovation process. For example, managers may consider the adoption of new forms of ICT as a means of addressing problems within their scope of responsibility. Their interest in adopting new ICT may be viewed as a response to a perceived organizational need or their own more narrow need to enhance information processing or communication within the organization. Simultaneously, the perceived ease of use and overall usefulness of ICT to such managers may also increase the adoption and implementation of new technologies (Bugler & Bretschneider, 1993). Knowledge of new ICT applications is also closely tied to the extent to which organizational personnel seek out and receive ICT-related information from sources external to their normal work environment. Organizations whose personnel interact with professional associations, educational institutions, consulting firms, or vendors of ICT products tend to be more aware of how ICT may be used to address organizational tasks.

## Resource Availability

With regards to digital government innovation, an important enabling factor is the sufficient availability of organizational resources to adopt and implement the ICT in question. With regards to the adoption of ICT, resources may come in several forms, including sufficient personnel with knowledge of the ICT of interest, the status of existing ICT systems, or even sufficient time to adopt and implement the ICT, in addition to ordinary organizational activities. Significant problems often arise out of the lack of sufficient financial resources to obtain the hardware and software systems of interest or the necessary personnel resources to oversee the implementation of the new ICT innovation. Public organizations are often reluctant to use budgetary funds to invest in new ICT innovations when they may be already earmarked for existing organizational activities. For example, Hinnant and O'Looney (2003) indicate that financial costs are a factor in whether or not local governments were interested in adopting advanced ICT practices, such as personalization of online services. Other research has indicated that organizations are more likely to adopt new ICT systems or practices when the financial resources are at least partially provided above and beyond normal budgetary expectations. For example, the Commonwealth of Pennsylvania created the Technology Investment Program (TIP) in the late 1990's to assist agencies with additional funds to upgrade systems that were potentially vulnerable to year 2000 problems and to cooperatively adopt ICT systems that were being championed by the governor's Office for Information Technology (Hinnant & Sawyer, 2003). Such funding schemes reduced the risk for individual public agencies to both initiate and implement new ICT systems. However, unless such funding programs are protected from the possibility of government revenue shortfalls, they may be greatly diminished or eliminated altogether.

## Organizational Structural Arrangements

An organization's administrative arrangements play an important role in how successful public organizations will be during the innovation process. A classic depiction of public organizations is of highly bureaucratic structures with high degrees of centralization and formalized procedures. If this stereotype is true, public organizations may have more difficulty adopting new forms of ICT, especially if they do not clearly enhance the accomplishment of tasks core to the generation of services. After all, public organizations develop bureaucratic structures and formal routinized procedures at least in part due to the need to produce services in a stable and equitable manner. In such cases, public organizations will be weary of new ICT that might initially disrupt the production of public services (Wilson, 1989). However, in situations where public organizations see new ICT as a clear means of improving organizational processes or improving the production of services, public organizations may be more likely to positively perceive the new ICT system or application.

Taking such expectations into account, it is also important to highlight the interaction between ICT and an organization's structure. As a technology oriented toward altering information flows either within or across organizational boundaries, ICT may in and of itself, influence a public organization's formal and informal structure. For example, Kraemer and King (1986) found that the new ICT reinforced preexisting social arrangements or shifted power towards higher levels of management. In other situations, power may be shifted down and outward within the organizational hierarchy to those who more closely understand and manage the new ICT (Kreamer, King, Dunkle, & Lane, 1989; Kraemer & King, 1986). With the adoption of newer forms of ICT that make use of wide-area networks such as the Internet or WWW to expand

communication, organizational structure may be altered in unexpected ways. For instance, end users may increase their capabilities through a heightened ability to access and transfer information both within and across organizational boundaries through the use of the WWW or Internet. However, the underlying planning, development, and maintenance of an organization's information systems, and information assets, by centrally located ICT managers may once again centralize power within the public organization. Such findings indicate that structure plays an important role in the ability of public organizations to initiate and fully implement new forms of ICT; however, the ultimate reciprocal effects are difficult to accurately predict.

## The External Environment

The broader external environment within which a public organization resides also plays a role in how the innovation process unfolds. Economic and political actors within their external environment often heavily influence public organizations (Bozeman, 1987; Rainey, 1997). As already mentioned, the financial resources available to a public organization are one factor that influences the process of technological innovation. Since the budgets of most public organizations are directly or indirectly influenced (through tax revenues) by the vigor of the greater economy or political decisions regarding fiscal policy, their ability to adopt and implement new forms of ICT, to an important extent, is influenced by the external economic environment. Similarly, the adoption and implementation of ICT by public organizations are also influenced by the actions of political actors such as elected officials, political appointees, citizens, and businesses external to their organization. For example, the initial adoption and successful implementation of new inter-agency criminal justice database systems were linked to a consistent level of support from public officials who hold key elected or appointed positions within the government (Hinnant & Sawyer, 2003). In a similar manner, businesses, interest groups, or private citizens, as actors who either impact the generation and delivery of public services, or which receive those services, can each influence the adoption of ICT. Interest in the adoption of new online practices by cities and counties has been linked to a perceived need or demand for such practices by the citizens within the local government's jurisdiction (Hinnant & Sawyer, 2003). In addition, many governments are adopting ICT systems to streamline the procurement processes that are used to buy goods and services from the private sector (Moon, 2002). As in the case of organizational structure, the adoption and use of specific ICT by government is not only influenced by external actors, but may also help shape the use of ICT by those actors.

At a broad level, the process with which ICT is adopted and implemented by public organizations is not a straightforward and linear process. While it is safe to say that the factors discussed: ICT characteristics, technical knowledge, resources, structural arrangements, and the external environment all influence the process with which new ICT are adopted and implemented, the process is more interactive and nonlinear than presented here. For instance, relatively early studies of personal computers in local government indicated that computer applications with greater public visibility and less uncertainty with regards to cost were more likely adopted (Perry & Danziger, 1980; Perry & Kraemer, 1979). Similarly, public managers may seek to use new forms of ICT, such as a portal on the WWW, to communicate more easily with external stakeholders, but find their efforts limited by budgetary limitations imposed by the economic environment (Gant, Gant & Johnson, 2002).

# FUTURE RESEARCH ISSUES: BROADER ISSUES OF ICT AND TECHNOLOGICAL INNOVATION FOR DIGITAL GOVERNMENT

The use of technological innovation as a theoretical basis for examining the adoption and development of digital government by public organizations seems valid, but it is important to understand that public organizations are only parts of a greater institutional framework of government. In essence, attention should be paid to the extent to which ICT alters traditional institutional arrangements and the extent to which such technology potentially improves governmental performance. One means of achieving such study is to consider an institution's technological core as architecture, or a set of ICT design decisions, that bring together different elements of ICT systems into a more coherent whole. Therefore, architectural innovation might take a broader view of how innovation and change within and between subunits, such as organizations, influences the overall performance of broader institutional relationships and performance (Agre, 2000, 2003; Henderson & Clark, 1990).

In addition to examining the broader connections between ICT, innovation, and government institutions, more attention needs to be paid to the differences between the actual goals and limitations of employing ICT in public, versus private, organizations and institutions. Government faces many challenges with regards to realizing the potential of digital government activities. One challenge that is often discussed concerns citizen and stakeholder access to ICT. While private sector firms only have to market and provide services to set groups of

customers who may buy or make use of a specific good or service, government must be accountable to broader segments of the population. For example, some citizens have adopted ICT, such as the Internet, WWW, or wireless technologies, for their daily use. However, some demographic groups have been found to have more limited access to the ICT that digital government often relies upon or may have insufficient technical skills to fully make use of such technologies (Agre, 2000, 2003; Thomas & Streib, 2003). Issues of access may serve to, in some ways, limit the ability of public organizations to adopt new ICT, especially if adopting ICT is intended to enhance communication or provide services to citizens or other external stakeholders. However, if external users adopt new ICT at high levels themselves, they may actually serve as a means to drive innovation on the part of public organizations.

Other challenges to developing digital government innovations also exist. Many governments are being forced to deal with technical and administrative issues that arise from the employment of ICT itself. For example, employing ICT to deliver services to the public requires more attention to issues, such as information assurance, ICT systems security, and overall organizational accountability. If public organizations wish stakeholders, such as citizens and private sector firms, to be willing participants in digital government activities, it must provide assurances that such information-intensive activities are well planned out and relatively secure from potential abuse. In essence, governments must seek to promote trust on the part of participants in the innovation process (Welch, Hinnant, & Moon, 2005).

## CONCLUSION

If the adoption of ICT by public organizations and their broader institutions of government is to lead to the benefits of improved efficiencies in the production and delivery of public services, public organizations must develop a clearer understanding of the social and technical factors that influence the process of technological innovation. The failure of large-scale ICT projects is not uncommon in either the private or public sector. However, the openness and transparency of public sector activities, as well as broader issues of accountability to the public at large, will always bring any failures or shortcomings within the innovation process to the light of public scrutiny. While this may cause some public sector organizations to be more apprehensive to undertake the development and adoption of new ICT, a greater lesson is that public organizations must pay special attention to identify and address possible problems within the innovation process itself. Furthermore, while the ICT inherent to current incarnations of digital government practices may be an important driver of change, its impact within the greater social structure of organizations or institutions is often difficult to anticipate. As public organizations increasingly look to digital government as a core part of their operations, they must seek a better understanding of how the factors within the innovation process interact together and, ultimately, impact the adoption and implementation of ICT.

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## NOTE

The views expressed here are solely those of the authors and do not necessarily reflect the views of the U.S. GAO or the U.S. government.

## KEY TERMS

**Architectural Innovation:** Innovations that involve a significant redesign of an organization's architecture. For instance, architectural innovation may require reconfiguring the technological components or systems of an organization or network of organizations in order to produce a significantly different aggregate arrangement.

**Digital Government:** The development, adoption, or use of ICT by government organizations and actors.

**Electronic Commerce (E-Commerce):** Conducting business and communication transactions over electronic computer networks. This may include the selling of goods and services, as well as the transfer of funds from customers. This may also include inter-firm (business-to-business) transactions, as well as intra-firm computer-based activities.

**Electronic Government (E-Government):** The use of ICT, such as the Internet and WWW, by public organizations, such as government agencies, to provide information and public services to citizens and other government stakeholders.

**Electronic Politics (E-Politics):** The use of ICT, such as the Internet and WWW, by political actors, to inform and facilitate public participation in the political process.

**Information and Communication Technology (ICT):** Devices, applications, or practices that facilitate information processing or communication processes.

**Internet:** A large system of interconnected computer networks composed of backbone networks, mid-level networks, and local networks. This includes networks owned and managed by public, private, and nonprofit sector organizations.

**Radical Innovation:** Technological innovations that are clear departures from an organization's current technological norms and, as a result, are perceived to impose significant risks if adopted and implemented.

**Technological Innovation:** The development and introduction of knowledge-derived tools, artifacts, and devices by which people extend and interact with their environment (Tornatzky & Fleischer, 1990).

**World Wide Web (WWW or Web):** A hypertext-based client-server system that is one component of the larger Internet. The hypertext-based format of the WWW allows users to navigate through the system by using graphical user interface software known as browsers.

# Teledemocracy

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## INTRODUCTION

Up until very recent times in Western political philosophy, theory, science, and discourse, the words predominantly used to describe the democratic pole of Aristotle's political continuum were *direct democracy*, *indirect democracy*, *social democracy*, and, in Aristotelian terms, *republic* or *representative democracy*.

The latter half of the 20th century, however, saw dramatic changes in democracy around the world in its spread, variation in form, and in the use of the word. In fact, there have been a number of books in recent years that have discussed a wide array of models or degrees of democracy (Held, 1996; Sartori, 1987). Phrases such as *participatory democracy*, *managed democracy*, *strong democracy* (Barber, 1984), and *semidirect democracy* (Toffler & Toffler, 1994) are just some of the clusters of terms now used to define particular kinds of democracy that exist or are theorized to be better forms of it.

Also, as the 20th century drew toward a close, there was a virtual consensus among Western political scientists that a potentially dangerous schism has grown between the citizens of both representative and social democracies and their governing elites. Indicators of such are public-opinion polls that manifest an increasing discontent with the political class and politicians (usually termed *alienation*) and a general decline in voter turnout (albeit with occasional upticks).

Most of this dissatisfaction with, or alienation from, various forms of representative democracy is considered to be due to the growth of the influence of those who lavish large sums of money on the public's representatives in these political systems. Another widely perceived cause of this gap between the people and their governments is the inertia of bloated, entrenched bureaucracies and their failure to acknowledge the wishes of the general public in policy implementation. Both of these phenomena seem to be present in all modern, industrialized, representative democracies, and they even seem to become manifest in the youngest, least industrialized countries as well. For example, in the fall of 2004, Cerkez-Robinson (2004) reported that the turnout in the Bosnian national election had fallen precipitously because most Bosnians are tired of repeated fruitless elections.

As this complex problem in modern representative democracies seems to have become systemic, a potential technological solution has also come upon the scene. This involves the previously unimaginable proliferation of information and communications technologies of the late 20th century and early 21st century. This new and rich mixture of rapid, electronic, interactive communications has been seen by many political thinkers and actors as an excellent medium by which to close the gap between the people of representative democracies and their elected and administrative officials.

This has led to a plethora of new adjectives and letters to prefix the word *democracy*, each referring to some theoretical or experimentally tested improvement in the present and future forms and practices of both direct and/or indirect democracy using ICTs. Thus, in the past decade or so of reinventing government (Osborne & Gaebler, 1992), we have come to learn of such new ideas and ideals of democracy as *electronic democracy* (or e-democracy), *digital democracy*, *cyberdemocracy*, *e-government*, and *teledemocracy* (Becker, 1981; this listing is far from exhaustive.)

Taken together, they demonstrate that the future of democracy around the world is in flux, that there is a broadly perceived need by those in and outside government for some changes that will ultimately benefit the general public in various aspects of governance, and that these new technologies are seen by many as part of the solution. As alluded to above, there are numerous experiments and projects along these lines that have been completed, many are in progress, and there are multitudes to come that probably will be a part of any such transformation in the future of democracy on this planet.

## BACKGROUND

In December 1981, I wrote an article for *The Futurist* that was titled "Teledemocracy: Bringing Power Back to People." I had not heard, seen, or remembered reading the word before using it, and some scholars told me that it was too vague and unclear to be of much use. Nonetheless, I have continued to use it in numerous contexts, as have some others (Arterton, 1987; Ytterstad et al., 1996).

This article will attempt to clarify how I originally employed it, how I modified it over the years to bring about greater clarification, and where it stands now and into the future. This is necessitated by the fact that others have come to either misinterpret or misrepresent the essence of the concept as it was originally conceived and since refined by myself. I will also point out how my usage of teledemocracy can be distinguished from the generic use of some other related concepts like e-government, digital democracy, and so forth. Finally, I will point out how some others are using it or a more generic term, more or less in line with my original and/or revised definition.

In the original 1981 article, I referred to the phenomenon of burgeoning citizen abstention in most democracies, which was apparent well before then (Levin, 1960). I also acknowledged a number of experiments in using interactive television and the increasing use of national referenda in some Western social democracies on major issues. In addition, I made reference to new methods of scientific deliberative polling that were proving to be successful in stimulating thoughtful survey results in lieu of conventional scientific public-opinion polling (using random-digit dialing methods), which produced a superficial, top-of-the-head, oft-cited but equally oft-disparaged public opinion.

Here is the way I defined it at first:

*Teledemocracy—the term coined for electronically aided, rapid, two-way political communication—could offer the means to help educate voters on issues, to facilitate discussion of important decisions, to register instantaneous polls, and even to allow people to vote directly on public policy.* (Becker, 1981, p. 6)

Some others have agreed that this was, indeed, the first usage of this term. In 1997, a thesis at a university in Germany written by Martin Hagen stated that

*the oldest concept of electronic democracy is "Teledemocracy." Developed in the 1970s, it became the first widely accepted concept of electronic democracy in the 1980s. While it is impossible to trace who first coined the term "teledemocracy," it was used by Ted Becker...in the late 1970s.*

A European Union report on May 31, 2001, that is on the Internet noted that the term teledemocracy was originally coined in 1981 (http://www.eucybervote.org/Reports). A Spanish Web site that also reported the results of a thorough search on the word is also in agreement on the original coinage.

As time passed and I became aware of further developments in this field, I continued to revise and clarify what I meant for teledemocracy to include that was entirely consistent with the original coinage. In 1986, in a book chapter called "Teledemocracy Emergent," I came up with what I believe to be a somewhat clearer definition:

*The great difference in feeling and perception between protagonists and antagonists of teledemocracy does not stem from any problem with definition. Quite simply, teledemocracy is the use of telecommunications technology to promote, improve, and expand (a) direct, pure democratic forms such as town meetings, initiative, referendum and recall; and (b) the citizen information and feedback functions of indirect democratic forms such as republics, where the population elects various legislative and executive officials to plan, promulgate, and carry out public policy. In other words, teledemocracy would include such novel phenomena as "electronic initiatives," "electronic town meetings (ETMs)," and "electronic public hearings."* (Becker, 1986, p. 264)

In essence, this was a lexical definition based on the developments in using ICTs in ever new ways to help the public become better informed, thoughtful, and active citizens so as to "generate a more democratic republic and a stronger system of direct democracy in the future" (Becker, 1986, p. 267). By implication, through the addition of the word thoughtful, the idea of two-way was expanded to include multilateral discourse among many people and to crystallize that teledemocracy was not limited to two-way TV interactions. This should have been manifested from the fact that in the televote method of scientific deliberative polling that was the major empirical basis of the concept of teledemocracy, the randomly selected respondents were encouraged to discuss the contents of the survey brochure with friends, relatives, coworkers, and family before deciding and voting (Campbell, 1974; Slaton, 1992).

Unfortunately, the ideological foes of this definition and vision (and the experimental phenomena upon which it is based and to which it often refers) are many and well placed, and do not have the same democratic values in their view of the role of the public in a representative democracy. These opponents of teledemocracy particularly entertain extremely negative views of direct democracy or more direct citizen engagement in any governmental activity. Thus, one of their ploys has been to misrepresent the definition of teledemocracy as being one in which (a) citizens are isolated in their homes to vote electronically and do not in any way deliberate together (Elshtain, 1982) and/or (b) representative democracy must be replaced by direct electronic democracy.

In his book that describes and analyzes many of the same projects conducted or discussed by Becker and others cited above, Christopher F. Arterton (1987) con-

fuses teledemocracy with something he calls plebiscitary democracy. In other words, it is his claim that the concept of teledemocracy refers exclusively to, and is synonymous with, citizen empowerment through and in direct democracy, a view that it is incorrect. This inaccurate assertion of what the concept means was highlighted by the fact that he titled his book (which was the first to use this word as a title) *Teledemocracy*. Thus, this tactic has aided those opposed to the phenomena defined by the word teledemocracy by distorting its original meaning since anyone only familiar with Arterton's book would think his definition was the actual definition, which it is not. So, it is crucial that the encyclopedia on this general subject be the ultimate definer of what the original and refined concept of teledemocracy actually means—according to the person who coined the term and has been using it longer than anyone else alive today (2006). The general and fundamental underlying theme in the concept of teledemocracy, then, is empowering the public via ICT in obtaining a wide variety of information and opinions, thinking about it, talking and listening to other people's views about it, deliberating on the issue(s), and then having the power to make a decision (vote, opinion) that will be injected into some official process of planning, prioritization, agenda setting, policy making, or policy implementation in either an influential or binding way.

Often included, and sometimes exclusively such, are face-to-face meetings and experiments in which random or stratified (and in rare cases self-selected) samples of the citizenry come together to listen to a full range of information and opinions, and then deliberate on one or more issues that will bind officials to adhere to their considered opinion (called planning cells in Germany and consensus panels in Denmark, which are well covered by the mass media). These are encouraged by the full definition of teledemocracy; however, they are just one method in a mélange of empowering techniques that in some way utilize modern ICTs to enhance the inclusion of more citizens in any face-to-face process and/or to expedite and facilitate consensus in very large meetings (thousands of people in one place at one time, or multiples of that being interfaced via satellite communications). The reader is invited to see an advanced model of this at http://www.americaspeaks.org and to become familiar with Listening to the City as a sophisticated, working model of 21st century teledemocracy and how it is designed and operates.

All this is made quite clear in the most recent advance on this definition to be found in Ted Becker and Christa Slaton's work *The Future of Teledemocracy* (2000). In that work, we define teledemocracy in another complementary way as a "comprehensive 21st century democratic political communications system" that is both lateral and interactive, using all available methods of ICT at the time as well as facilitation techniques to improve citizen participation in either representative or direct democratic processes (pp. 178-197).

## THE MAIN DISTINCTION IN THE DEFINITIONS IS IDEOLOGICAL

The main difference between the concept teledemocracy and other similar-sounding concepts like digital democracy, e-government, and deliberative democracy could be construed as a matter of emphasis, or it may be a matter of ideology. I believe it is the latter.

In my viewing of scores of other Web sites that use any of these phrases, the most pervasive ilk devises and tests ways in which electronic technologies, particularly the Internet, can improve representative governmental services in order to make governance more efficient. Thus, these sites accent such things as putting governmental services online, letting constituents talk to their representatives or other governmental officials, using the Internet as a grassroots tool to help design and run campaigns for candidates and issues, and, on occasion, having the government consult with the citizenry in nonbinding ways.

Perhaps one of the most advanced Web sites along these lines is that of the International Teledemocracy Centre at Napier University in Scotland (http://itc.napier.ac.uk). It has been online for many years now and combines highly innovative uses of digital democracy and e-democracy into its concept of teledemocracy. In looking through it, however, one is struck by its operational definition of teledemocracy being limited to expanding and strengthening the bonds between citizens and their representative system via consultations and petitions. Although its work is excellent and admirable, it shows how the preponderance of the work being done in the name of teledemocracy and its allied concepts is very much ideologically aligned with Arterton (1987) and similar authors in avoiding more direct democratic approaches to citizen empowerment that actually make, or have measurable direct impact on, major public decisions via a combination of face-to-face meetings and the complementary use of ICT.

Thus, as far as the originator of that concept is concerned, when properly used, teledemocracy is an umbrella concept that can be used in all kinds of citizen empowerment in all kinds of democratic practices (surely including ways to make direct democracy more effective, expansive, and binding at all levels of governance) using a wide array of innovative technologies and techniques, electronic and otherwise. And yes, I believe this should be done, which makes the term teledemocracy an ideo-

logical, as well as scientific, term. It was that way from the beginning and no amount of ignoring, misrepresenting, or tinkering can change that fact. If it does not truly empower the citizenry, then call it something else.

## FUTURE TRENDS AND CONCLUSION

The empirical phenomena that were originally defined and refined as the concept of teledemocracy continue to flourish and grow, though not under that rubric. There is an increasing myriad of projects and experiments around the world that test and develop new ways of engaging citizens in meaningful face-to-face or electronic (or some combination of both) deliberative meetings, where the results of such are quickly conveyed to government officials either to be part of their decision-making processes or implemented as policy. (An excellent recent example is the Citizens Assembly of British Columbia.) Many of these are now being aggregated under the concept of deliberative democracy.

In light of the popularity of that term, which seems to include all of what I meant by teledemocracy, the person who coined the concept teledemocracy and put up the first Web site devoted to such projects (Teledemocracy Action News + Network, TAN+N at http://www.auburn.edu) now reports on the further evolution of authentic citizen empowerment in *The Journal of Public Deliberation* at http://www.services.bepress.com and http://www.auburn.edu/jpd. In reality, then, teledemocracy seems to be verbally morphing into deliberative democracy.

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## KEY TERMS

**Deliberative Democracy:** A transformation in representative democracy in which representative groups of citizens are encouraged to participate as planners, lawmakers, and/or implementers of policy through complex deliberative processes via face-to-face meetings, electronic meetings, electronically enhanced meetings, or some combination of both.

**Direct Democracy:** Where citizens can act directly as lawmakers or planners through either facilitated or free elections and where their decisions become the law or the plan without being filtered afterward through any other officials other than, perhaps, the courts to see if their decisions are constitutional.

**E-Democracy:** Electronic discussions among citizens in which the results of their deliberations are given some force in the decision making of officials or in which their votes count in some way to make laws, plans, or regulations.

**E-Government:** The use of modern ICT by governments to allow citizens to access information from the government, to discuss issues and/or problems with officials, and to carry out administrative tasks, like getting licenses or paying fees, through electronic ICT.

**Electronic Town Meeting (ETM):** A comprehensive bringing together of large numbers of citizens to discuss

some important issue or problem using electronic technologies to help them set priorities, set agendas, or inform officials of any consensus or majority opinion that may be formed by the discussion. It is a method used in e-democracy, teledemocracy, and/or deliberative democracy

**Participatory Democracy:** A theoretical concept that includes more specific manifestations such as deliberative democracy, direct democracy, e-democracy, electronic town meetings, and teledemocracy.

**Representative Democracy:** A form of indirect democracy in which citizens elect others to represent them as lawmakers in deliberative processes. E-government is a new way for representatives to send information to the citizens and to allow citizens to access the government for administrative purposes.

**Scientific Deliberative Polling:** A new method of feedback from the public to its representatives. This method of surveying citizens about their opinions on important issues selects the respondents by random or stratified methods so as to make certain that all major demographic groups within the polity are represented within a small margin of error. The respondents are given information and opinions, and time and encouragement to talk among themselves before coming to a final opinion.

**Teledemocracy:** Another concept closely allied to that of deliberative democracy, representative democracy, and direct democracy that uses e-democracy, electronic town meetings, and scientific deliberative polling in order to empower citizens to directly affect or make laws and administrative decisions.

# The Telehealth Divide

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## INTRODUCTION

In the United States, the public is accessing the Internet to provide information and deliver services, and to interact with citizens, business, and other government agencies (Bimber, 1999; Pardo, 2000; West, 2003, 2004). As with any change between citizen-government interactions, e-government is accompanied by speculation on its impact to both citizen and government. E-government capability of continual service delivery can make government efficient and transparent to the public (Norris, 1999; West, 2003), and more responsive to public needs through fast and convenient communication options (Thomas & Streib, 2003). It permits quicker material update than traditional distribution methods (Pardo, 2000).

However, other literature suggests e-government will not live up to these prospects. A separation exists among citizens that use and do not use the Internet. This separation is based on a number of factors, including inequalities in Internet access "digital divide" and technological skills, along with psychological and cultural barriers. Literature extensively shows the differences in United States Internet use to fall along important socioeconomic and demographic factors, such as age, race, education, and income (Mossberger, Tolbert, & Stansbury, 2003; Neu, Anderson, & Bikson, 1999; Pew Internet & American Life Project, 2003c; U.S. Department of Commerce, 2002; Wilheim, 2000). E-government may create inequalities in the delivery of government information and services.

Telehealth is a specific form of e-government aimed at improving the accessibility and quality of healthcare, and reducing service costs (Schmeida, 2004a). It relies on electronic information and telecommunication technology innovation (H.R. 2157, 2001). As nations contend with expensive healthcare, the promise of better healthcare service delivery at a reduced cost has made teleheath an increasingly attractive policy option in the United States and internationally.

Telehealth advancement greatly reflects the dramatic changes in the telecommunication industry. In the 1990s, we witnessed considerable advancement, such as the use of digital technology—interactive video and Internet. Interactive video, for example, can link doctors and medical students afar improving medical education. Rural citizens can interact with specialist(s) through interactive video rather than traveling great distances for a medical consultation. The Internet can bring health related information into the home for better healthcare decision-making.

Telehealth can be conceptualized as both an administrative reform policy and regulatory policy. As a hybrid policy type, it mostly exhibits the characteristics of administrative reform, such as e-government (McNeal, Tolbert, Mossberger, & Dotterweich, 2003; Schmeida, McNeal, & Mossberger, 2004) driven by the goals of cost reduction and increasing efficiency, paramount to telehealth adoption and implementation. Administrative reform policy does not involve the direct and coercive use of government power over citizens and are therefore associated with low levels of conflict (Ripley & Franklin, 1980). Regulatory policy, on the other hand tends to be politically salient among citizens as well as controversial among the actors within the policy community.

Traditionally, those interests who are regulated have been important players in the policy process. Important telehealth players are physicians, nurses, pharmacists, and health insurers. Since telehealth straddles both administrative and reform policy areas, it is difficult to predict the actors that will play the greatest role in assisting or impeding its implementation. Execution of regulatory policy is highly volatile and controversial with shifting of alliances and players. However, administrative policy innovations are low salience, and as some regulatory policies it involves technical issues, often driven by professional networks and elected officials.

## TREND STUDIES ON INTERNET USE AS A HEALTHCARE TOOL

Although policy actors, cost containment and advances in technology are driving the adoption of telehealth, its

impact is contingent on factors, such as Internet access among members of the public. The Internet provides information on various health and medical-related topics through government sponsored and private sector Web sites. Today, more Americans are conducting Internet health and medical-related searches. On an average day, about six million people get online to search for medical-related information (Pew Internet & American Life Project, 2002) for better decision-making on self-care and helping others (Pew Internet & American Life Project, 2003b). Across different health and medical issue topics, Pew (2003b) found online searches for information on a specific disease or medical problem leads the topic areas searched. In addition to using the Internet for health information searches, about 30% of e-mail users have e-mailed their doctors and other health professionals, thus bridging the gap between patient and doctor, particularly specialists over great distances. This elementary form of telehealth (information search, and doctor and patient correspondence) exemplifies the potential of telehealth. Yet, while becoming a commonly important healthcare tool, not all citizens including those most in need of online health and medical-related information (the elderly and poor) are taking advantage of the online services (Schmeida, 2004b).

Research on demographic groups using the Internet to search for health information is sparse and does not establish with any certainty what factors matter in predicting who is taking advantage of this form of e-government (Schmeida, 2004b). However, multivariate statistical research on computer and Internet access does exist and may help us better appreciate the barriers facing the utilization of telehealth. Mossberger, Tolbert, and Stansbury (2003) find both an Internet access and skills divide, indicating inequalities in home Internet access, e-mail use and computer ownership. The research suggests there are gaps based on race/ethnicity with whites more likely than African-Americans and Latinos to have Internet access. Inequalities were also found on education and income with higher income being associated with greater Internet and computer access and ownership. Age was also an important factor with young persons more likely to be connected (pp. 32-35). Compounding the access divide are differences in technological skills. Mossberger et al. (2003) find a skill divide exists closely mirroring the access divide with the poor, older, less educated, and non-whites less likely to have technical skill, that is, technical competence or information literacy. As important as having access at home are the technical skills for computer operations and information literacy to locate and effectively use computer information.

## A TELEHEALTH DIVIDE MATCHING THE DIGITAL ACCESS DIVIDE

Do those who are least likely to have computer and Internet access match that of a potential telehealth divide? Based on literature showing disparities in Internet access and use (Mossberger, Tolbert, & Stansbury 2003; Pew Internet & American Life Project 2003a; U.S. Department of Commerce 2002), it is expected that disparities in Internet use for health searches would also exist. Using the 2000 Pew Internet & American Life (2003b) survey data and controlling for demographic factors with regression analysis, Schmeida (2004b) found several factors important in explaining which citizens are searching for health and medical information online.[1] Persons who are young, white, with a higher education and income, are more likely to search for information online.[2] Also, females and household healthcare givers are more likely to conduct searches than males and non-caregiver.[3] The findings suggest that older persons, who face more health-related problems, ironically are less likely to take advantage of these telehealth services. However, females are more likely to search online, as might be expected since they have been more active in health searches in the Pew Internet & American Life Project (2003b) study and are more likely to be caring for another person(s) at home.

Unexpectedly, race (Asian Americans and African-Americans) was not a significant predictor of a telehealth divide, differing from previous studies showing these minority groups are "have-nots" in Internet access at home. On the state level, McNeal et al. (2003) found racial diversity was not a significant predictor in percentage of state government Web sites providing services to state residents. While, Schmeida, McNeal, and Mossberger (2004) found state racial context mattered in influencing implementation of telehealth policy. This suggests that minority context may matter more for telehealth implementation. Latino (who were found significantly less likely to search for online health information) contextual barriers to computer literacy, such as entrenched resistance to acquiring computer skills (Stanley 2003) may be factors for further research.

## CONCLUSION

The policy implementation literature directs us to examine factors, such as political actors, the need/ demand to contain costs and increase healthcare efficiency, important to explaining the adoption and implementation of telehealth. To understand the impact of this policy, we

cannot, however, lose sight of factors, such as public Internet access and use. Research statistically controlling for demographic factors on telehealth use is limited. However, using regression we control for these factors and with certainty find disparities between demographic groups searching for health information on the Internet. A telehealth divide exists and in general mirrors the contours of the digital divide. As with the digital access divide—those who are least likely to have a computer and Internet access at home are the poor, less educated, older, Latinos and African-Americans (Mossberger et al. (2003) face barriers in taking advantage of services made available by telehealth. That is, persons who are poor, less educated, older, and Latino are least likely to search online for health information than others (Schmeida, 2004b).

Persons most in need of online health information are not accessing it. These findings suggest a dilemma, those in greatest need of information, such as, the poor and elderly are not seeking it online. The ramifications are significant suggesting the "advantaged" will obtain superior healthcare and treatment than the "disadvantaged." As advanced technology replaces labor-intensive information specialists, for example, the U. S. Centers for Medicare & Medicaid Services (2004) Web site, parity between demographic groups is essential. As literature suggests that e-government will not live up to the prospects of efficiently improving healthcare for all people, our findings show that indeed e-government maybe creating inequalities in the delivery of government information and services.

Effective information technology use depends on user knowledge and skills. Technical competence, information literacy and basic literacy are required for the information age for effective use of telehealth. Today, public access cites, such as computer technology centers are giving individuals both access to computers and educational opportunities to overcome literacy barriers (Mossberger, et al. 2003). Bridging the gap may be progressed by community services and educational opportunities, yet evolving. The adoption of telehealth reminds us that with adoption of any new policy, it must be evaluated on more criteria then efficiency. Criteria, such as equality in costs, benefits and risks must also be considered.

Although this article considers policy diffusion among the United States, it has implications for the international community in terms of lesson drawing. As the literature reminds us, countries often look to their neighbors for policy ideas (Bennett, 1997; Wolman, 1992) for emulation. This has proven to be the scenario between the United States and many other nations, all-searching to improve the health of their citizens while facing rising heathcare costs.

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## KEY TERMS

**Centers for Medicare & Medicaid Services Web site:** A United States government Web site that provides information to needy groups on Medicare and Medicaid services, state children's health insurance, and clinical laboratory testing.

**Digital Access Divide:** Disparities between groups on demographic factors, such as gender, age, income, education, race, and ethnicity in accessing digital information technology, such as on the Internet.

**Telehealth:** The term is often interchanged with telemedicine. There is no consensus on its definition. However, the United States Congress defines it as the use of electronic information and telecommunications technologies to support public health and health administration, long-distance clinical healthcare, patient and professional health-related education (H.R. 2157, 2001).

**Telehealth as an Administrative Reform Policy:** As an administrative reform policy, telehealth is highly technical, not political charged although it may be conflictual in the policy community. Unlike regulatory and re-distributive policies, it does not involve the direct and coercive use of government power over citizens. Telehealth behaves mostly as an administrative reform, with its policy goals emphasizing greater efficiency in terms of cost savings.

**Telehealth as a Regulatory Policy:** Although regulatory policy may be politically salient among citizens, telehealth may be conflictual within the policy community. The regulatory aspects in this policy area may engage the participation of networks of healthcare interest groups, such as nurses, pharmacists and physicians. A moderate level of conflict over the issue may lead to some interest group activity by those who are liable to be covered by state regulations.

**Telehealth Divide:** Disparities between groups on demographic factors, such as gender, age, income, education, and race in using digital information technology, such as the Internet to search for public and private health and medical-related information online.

**Telehealth Policy:** An electronic government policy that uses the Internet to improve accessibility of public and private and non-profit healthcare services in rural and urban areas, while improving the quality of services at a lower service cost.

## ENDNOTES

[1] Similar question as the Pew survey is asked but demographic factors are controlled for by using negative binomial regression analysis: Have you ever looked online for any information on any of the 16 health and medical issues?" The 16 issues are: specific disease or medical problem; certain medical treatment or procedure; experimental treatments or medicines; alternative treatments or medicines; diet,

nutrition, vitamins, or supplements; exercise or fitness; prescription or over the counter drugs; immunizations or vaccinations, how to quit smoking, problems with drugs or alcohol; depression, anxiety, stress or mental-health issues; environmental health hazards; sexual health; particular doctor or hospital; health insurance; and Medicare or Medicaid insurance. Our dependent variable is a count of all "yes" responses to each health and medical issue topic, ranging from 0 to 16. An individual who has searched for all 16 medical issues is coded as 16 and someone who has looked for no medical issues is coded 0 (Pew Internet & American Life Project, 2003b).

[2] Age is in years, while education is a 7-point Likert scale measuring the last grade or class completed in school. Income is measured on an 8-point scale measuring the total family income from all sources before taxes in 2001 ranging from less than $10,000 to $100,000 or more (Pew Internet & American Life Project, 2003b).

[3] Household healthcare giver is defined as either a primary or secondary healthcare giver to a member in their household (Pew Internet & American Life Project, 2003b).

# The Information Society and the Danger of Cyberterrorism



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## INTRODUCTION

Computers have always caused psychological uneasiness in the human brain. That a computer is the closet thing to a thinking machine can be discomforting. That average users have little understanding of the complexity and intricacies of how computers and software operate only add to the distress. Networked computers further increased the puzzlement of human beings. The media (suffering from the same poverty of information as the public) have picked up catchwords like *cyberwar, netwars, cyberterrorism*, and *cybercrime.* Speaking of Electronic Pearl Harbors and comparing modems to bombs have only contributed to increasing the level of media hysteria and confusion in public opinion. Schwartau (1994) is a classic example. Imagine that poorly informed journalists start telling the general public that ruthless hackers (hired by terrorists) could take over the power grid and shut it down, or cause patients' death after their medical records have been compromised. The mere suspicion that terrorists could perform such acts would be enough to fueling the fear factor, which regularly happens as a result of this crying wolf.

Under these circumstances, cyberterrorism seems like a nightmare come true. As Embar-Seddon (2002) noted, the word terrorism brings together two significant modern fears: the fear of technology and the fear of terrorism. Both technology and terrorism are significant unknowns and unknown threats are generally perceived as more threatening than known threats. To some extent, cyberterrorism does not need to be manifested itself in any significant way because many already believe it to be real. This article will try to dispel some of the myths of cyberterrorism, such as the contention that terrorists could remotely take control of critical infrastructure and thus bring a country to its knees. In fact, today, cybercrime and economic damage caused by hackers are far more real and serious threats than terrorists. Misdeeds are more likely to be committed by disgruntled insiders than skilled outsiders (Randazzo et al., 2004).

There is no commonly accepted definition of terrorism, hence cyberterrorism has been variously interpreted. For example, Sofaer et al. (2000) defines it as "intentional use or threat of use, without legally recognized authority, of violence, disruption or interference against cyber systems" (p. 26), resulting in death or injury of people, damage to physical property, civil disorder, or economic harm. The probability, however, that cyberattacks may actually cause victims is extremely low. Furthermore, Sofaer et al. tends to exclude states from committing terrorist acts, which is also debatable. Hughes (2004) observes cyberterrorism as a diverse set of technologies whose purpose is to scare people, but scaring people without getting anything in return is simply useless. Paraphrasing a working definition of terrorism, I would identify cyberterrorism as the use of digital means to threat or undertake acts of organized violence against civilians to achieve political advantages. Perpetrators then could be nonstate groups or sovereign states. Terrorists spreading scary stories to terrify the populace via the Internet would also qualify.

Finally, because of cost efficiency, information and communication technologies have blurred the distinction that long existed between the noncombatant and the combatant spheres. The technology on which the military now rely is exactly the same commercial off-the-shelf hardware and software products that civilians have in their homes and offices (Department of the Army, 2003). Military and civilians alike use largely the same computer networks, which were designed for ease of use and not for hardened communications. During the Cold War, dual use technology (civilian hardware and software) was considered "dangerous" because it could help the Soviets close the gap with the West. Paradoxically, dual-use technologies are now "good." One of the many downsides of such a situation is that if terrorists hit computer networks, in theory, they could hit multiple targets: the economy, law enforcement agencies, emergency services, and (albeit to a lesser extent) even the military. For terrorists this scenario would be a dream come true. Reality, however, is substantially different.

## BACKGROUND

The first report to highlight vulnerabilities and risks for societies highly dependent on computer networks was the Tengelin report, in the 1980s (Tengelin, 1981). Soon

*Table 1. National critical infrastructures (Source: personal elaboration based on Randazzo et al., 2004, Wenger, Metzger, and Dunn, 2002, Commission of the European Communities, 2004)*

| E.U. | United States | Australia | Canada |
|---|---|---|---|
| Finance | Banking and finance | Banking and finance | Financial services |
| Communications and information technologies | Information and telecommunications | Communications | (Tele) Communications and Information services |
| Energy, oil, gas | Food, energy, water | Energy and utilities | Energy and utilities |
| Transport | Transportation and shipping | Transport and distribution | Transport |
| Government | Postal, emergency services, defense industrial base, continuity of government | Other critical government services (e.g., defense and emergency) | Safety |
| Food and water | Agriculture | | Safety |
| Healthcare | Public health | | Safety |

sociologists began to explore "the world of high-risk technologies" (Perrow, 1999), where "normal accidents" might occur in risky enterprises, like nuclear power plants or air traffic control, resulting in the deaths of hundreds and crippling the lives of thousands or even millions. After the publication of the Tengelin report, more governments, in primis the U.S. federal government, became sensible to the issues. The issue of computer-dependent societies skyrocketed in the 1990s with the diffusion of the Internet.

In 1998, U.S. President Clinton signed the Presidential Decision Directive 63 (White House, 1998), the first official document to identify "critical" sectors (information and communications, electric power, transportation, oil & gas, banking & finance, water, and emergency services) for protection. Disruption in one or more of these sectors would seriously compromise the survival of the United States as a sovereign country. The U.S. government has revised and refined the list of critical infrastructures several times since 1998 (the Patriot Act of October 2001 also mentioned the necessity to protect the country's critical infrastructures). The most recent modifications were included in the *National Strategy to Secure Cyberspace* in 2003 (White House, 2003). More recently, the E.U. has also come up with a list of critical infrastructures. The items on the E.U. list resemble very closely those sectors identified by the United States government and those of other advanced countries (see Table 1).

The U.S. military first considered "information operations" in the early 1990s. The Gulf War was actually the first information war (Campen, 1992; Libicki, 1995). Information operations involve "actions taken to affect adversary information and information systems while defending ones own information and information systems" (Joint Forces Staff College, 2003, p. 1). Adversaries could be hackers, criminals, vandals, terrorists, transnational groups and nation states. Computer Network Operations are a subset of information operations and may include psychological operations, open source intelligence, *hacktivism* (Denning, 1999), and so on. Perception management (the old propaganda), via selecting bits of information may demoralize the adversary and even obtain that victory without fighting, which Chinese strategist Sun Tzu (400 B.C.) portrayed as superior to other forms of winning.

More worrisome for the United States and other advanced countries is that even non-state actors like terrorist groups could become skilled enough to launch cyberattacks. Alberts (1996) noted that such acts would entail serious consequences for information infrastructures. Among the first to explore this eventuality were RAND researchers Arquilla and Ronfeldt, (1997, 2001), who investigated "cyberwars" and "netwars." Netwars, involving "nonstate, paramilitary, and other irregular forces," would be located "increasingly at the societal end," where "military operations other than war" were (Arquilla & Ronsfeld, 1997, p. 275).

At the end of the 1990s, Nelson et al. (1999) of the Center for the Study of Terrorism noted that "the majority of literature dealing with cyberterrorism has focused principally on the vulnerabilities of critical infrastructures" (p. 3). Exercises like Black Ice or Blue Cascade (Verton, 2003) focused on disruption of critical infrastructures and penetration of supervisory control and data

*Table 2. Typologies of terrorist groups/attacks (Source: personal elaboration based on Nelson et al., 1999 and Department of the Army, 2003)*

| Type | Attack Levels | Objectives |
|---|---|---|
| Etno—nationalists/ separatists/autonomists (Basques, Palestinians, Kurds, etc.) | Advanced, structured attacks | Economic loss, major disruption of services |
| Old style revolutionary (Red Army Faction, Red Brigades, IRA, etc.) | Advanced, structured attacks | Economic loss, major disruption of services, possibly fatalities |
| Right wing extremists | Simple, unstructured attacks | Nuisance, loss of some data, service interruption |
| New age terrorists (e.g., Animal Liberation Front) | Advanced, structured attacks | Economic loss, major disruption of services |
| Religious fundamentalism terrorism | Complex, coordinated attacks | Total disruption of services, major economic losses, fatalities |
| Hackers (Script kiddies?) | Simple, unstructured attacks | Nuisance, loss of some data, service interruption |

acquisition systems in the U.S. The type of cyberterrorism that advanced countries feared the most was akin to the military version of information operations (see Table 2).

The term *cyberterrorism* conjures up an endless list of doomsday scenarios, which journalists seem to pick up at regular intervals (Anderson, 2002; Arena & Ensor, 2002; Corera, 2004; Vise, 2001). Several authors (Denning, 2001; Embar-Seddon, 2002; Giacomello, 2004; Green, 2002; Hutter, 2002; Lewis, 2002; Ranum, 2004; Schneier, 2000, 2003a, 2003b), however, have demonstrated that for the time being cyberterrorism is not a realistic threat and that resources should be focused elsewhere. The consensus among security experts is that there has never been a recorded act of cyberterrorism pre- or post-September 11. This situation contributes to perpetuating a false understanding of the nexus between computer networks and national security. Opportunity costs for misallocation of public resources are extremely high and the risk of needlessly infringing personal privacy and civil liberties are also extremely great. Furthermore, Denning (2001) reckons that for terrorists to regard strikes at computer networks as a viable weapon, the attack should be sufficiently destructive or disruptive to generate fear comparable to that from *physical acts* of terrorism. Attacks that lead to death or bodily injury, extended power outages, plane crashes, water contamination, or major economic losses would be examples. Denning concludes that, presently, more traditional forms of attacks like car bombs are far more dangerous.

James Lewis (2002) of the Washington-based Center for Strategic and International Studies has analyzed the problem of cyberterror and other cyber threats from the perspective of potential victims of cyberattacks, in the United States, Europe, or Japan. Lewis concluded that, although computer network vulnerabilities are an increasingly serious business problem, "their threat to national security is overstated" (p. 1). Likewise, cryptographer Bruce Schneier (2003a) observed that not only had the threat posed by cyberterrorism been overestimated, but also that much of the hype was coming from the U.S. government.

## THE CURRENT SITUATION: MYTHS OR REAL DANGERS?

Journalists, law enforcement officers and even private sector CIO (chief information officers) tend to attach the tag "cyber terrorist" to a variety of subjects ranging from "script kiddies" interfering with their school's computer servers to professional terrorists. Already, in the mid-1990s, Alberts (1996) reckoned that the vast majority of attacks against domestic information infrastructures in the United States were carried out by "hackers, whose motives run the full gamut from financial motives to having some fun or to some more serious forms of antisocial behavior" (chapter 6). The U.S. *National Strategy to Secure Cyberspace* (White House, 2003) indicated as a primary concern "the threat of organized cyber attacks capable of causing debilitating disruption" (p. 6). But the same document also pointed out that the required technical sophistication to carry out such an attack was "high" and that the likelihood of the U.S. suffering a severe cyberattack was difficult to estimate.

The type of cyberterrorism that Nelson et al. (1999) worry about (outsiders taking over computer networks

*Table 3. Typologies of targets and damage (Source: Giacomello, 2005, 2004)*

| Type | Target | Damage | Fatalities | Personnel Required |
|---|---|---|---|---|
| (a) Perception management/ Propaganda | Image and self—confidence of the enemy | Psychological | None | One to three? |
| (b) Web defacement/ Taking over credit card and banking accounts | Private companies, banks, stock exchange, and so forth | Economic/ psychological | None | Two to several |
| (c) "Breaking things and killing people" | Air control /power and water distribution systems, and so forth | Human/physical/ economic and psychological | Yes | Several |

and sabotaging water distribution or 911 emergency systems) is not the one that has spread over the Internet. Rather, it is a cyberterrorism, which Thomas (2003) calls "cyberplanning" and Nelson et al. define as "support" of cyberterrorism, that is most widely found on the Internet. This cyberterrorism includes communications, recruiting, and propaganda, open source intelligence, and so on. Credit card fraud and other financial scams are also frequent. In many instances, cyberterrorism is very much like cybercrime: But is stealing credit-card numbers to use them for self-financing a terrorist act or cybercrime? Experts already agree that cybercrime is a bigger threat than cyberterror (Coren, 2005). Or, it might be that people overplay the risks of cyberterrorism, but then underplay the risks of cybercrime (Schneier, 2003b)? If one notes that the private sector in the United States and other advanced countries owns the largest part of the information infrastructure, these arguments are hardly surprising.

Further studies have confirmed the consistency of these arguments. According to the U.S. Computer Emergency Response Team statistics, until now, viruses, and worm attacks have caused denial-of-service or distributed-denial-of-service disruptions with massive economic losses in some cases but no physical destruction. If the main targets of those attacks had been the management systems associated with critical infrastructures, the potential physical damage would have been considerable. But that was not the case. Indeed, Randazzo et al. (2004) have shown, in a study for the U. S. Secret Service, that banks and other financial institutions are much more likely to be hit by cyberattacks. Moreover, Lewis (2002) also demonstrated that the most devastating impact of cyberterrorism would be on the *American economy* although the growth of cybercrime is likely to have longer lasting and more widespread consequences.

Institutional investors and financial markets are extremely sensitive to any news that may have even some remote effects on the world economy. A coordinated attack that, on the one hand spread false business information and, on the other, temporarily blocked communications to and from a few major banks or stock exchanges could seriously damage the economies of several advanced countries. Such an eventuality would certainly be an attack on a critical infrastructure. The motives of the perpetrators would be the real watershed to qualify them as terrorists or criminals. Cyberterrorism may certainly have overlapping features with cybercrime, but currently, these attacks are more likely to be motivated by ransom or financial scams than by political demands (Randazzo et al., 2004). In other words, behind these acts there are criminals, since politically-motivated terrorists are still a rarity in this field.

As terrorists could learn the same methods to raise money for their causes or engage in serious economic warfare, several countries consider the Council of Europe (CoE) Convention on Cybercrime a pivotal tool in tackling cyberterrorism. After September 2001, several European countries, along with the United States, Canada, Japan, Russia, and Australia signed the CoE Convention. The Council includes as members all EU countries along with Russia, Ukraine, Croatia, Turkey, and other Europeans. Negotiations for the convention started in 1997. With the rising awareness of the Clinton administration on protecting critical infrastructures, in 1998the FBI became actively involved in the drafting of the convention, since the United States, along with Canada, Japan, and South Africa decided to join the negotiations (as "observers"). The goal of the convention was to provide all member countries with some common definitions of what cybercrime should be, allowing better coordination of legislation and law enforcement. Within the general framework of the convention, all the members were supposed to adopt domestic legislation on the matter over time. Differences of opinion and of legal systems made negotiations sluggish however.

Most Council members quickly signed the convention in November 2001, following the 9/11 attacks. At a time when the United States was harvesting any ideas and tools to fight terrorism, it was hoped that the convention could help fight cyberterrorism. The convention entered into force in July 2004 (Council of Europe, 2004), but only for the eight states that actually ratified it. The E.U., Japan, and the U.S. did not ratify. Unlike the United States, the current emphasis of the E.U. and of other advanced countries seems to indicate that they want to continue considering cyberterrorism as a form of "crime" rather than a national security threat (Giacomello, 2005). Europol, the European Police force, for example, is tasked with primarily fighting cybercrime, with cyberterrorism conceived of as a "subsection" of the former. The same conclusion seems to apply to the newly founded European Network and Information Security Agency, which will focus on cybercrimes, with cyberterrorism being just one of them.

## CONCLUSION

Over three years after September 2001, terrorism is still a priority for many countries, but the surge in cyberterrorist attacks predicted in the wake of 9/11 has failed to materialize. In the meantime, interest in and instances of the less "glamorous" issue of cybercrime has risen sharply. While there are certainly some risks, the probability that external attackers could disable or seriously disrupt information infrastructures is, for the time being, still quite remote. Disgruntled insiders keen to extract revenge or organized criminals seeking ransoms are much more real threats. For societies highly dependable on computers, the other concrete risk is that attacks on networks will be launched to "multiply" the effects of conventional attacks in a war between states. In fact, offensive digital tools *will* be used, in the next war, to disable and destroy other countries national information infrastructure, to disrupt the economy, and interrupt utility distribution. Since the switches, routers, hardware, and software upon which civilians and the military rely are the same, civilians are likely to suffer considerably if such events to materialize.

While Americans and (to a lesser extent) Europeans, Canadians, Japanese, and Australians were devoting their resources to develop capabilities to fight the next cyberwar against state actors, terrorists have once more surprised them. Not only did terrorists not disrupt computer networks, but they have learned how to use the Internet and other digital technologies to ensure that their messages and declarations reach a wider audience and are reported with a resultant cascade effect in the Western media (Weimann, 2004). The negative balance should also register that governments have come to believe that there is an inevitable trade-off between civil liberties and security and that it is the latter that should prevail.

Online government surveillance has increased, but there is no hard evidence that this solution will raise the quality of intelligence gathering or the overall safety of societies. Democracies are reconsidering civil liberties and spending vast amounts of money but to foster the wrong cybersecurity. On the brighter side, however, independent experts (Lewis, 2002; Ranum, 2004; Schneier 2003a,) have shown that there are good solutions to protect societies and their infrastructures. Hopefully, policy makers will soon start to listen, if they understand that computer networks, with their economic and psychological position in modern societies, are too important to be left (only) to governments.

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## KEY TERMS

**Computer Networks Operations:** A subset of information operations; imply attacks to and defense of networks only through digital tools.

**Critical Infrastructure:** Utility and communication networks without which the physical and economic survival of a society would be impossible.

**Cyberplanning:** The use of the Internet to communicate, gather open source intelligence and spread their political messages by terrorist groups.

**Cyberterrorism:** The use of digital means to threat or commit acts of organized violence against the civilians to achieve political advantages.

**Hacktivism:** The use of computer networks by activist hackers to spread propaganda or to alter perception management in the public.

**Information Operations:** Actions taken to affect adversary information and information systems while defending ones own information and information systems.

**Perception Management:** The selection of bits of factual information to adversaries in order to manage their perceptions and behavior.

# Theory-Based Models of E-Government Adoption

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## INTRODUCTION

Too often, citizens view government as hopelessly ineffective and lacking in skill to deliver services in the same way that a bottom-line-focused private-sector business is able to effectively do. This view often informs a marked decline in political participation and a lack of confidence in the ability of public-sector agencies to effectively and efficiently solve problems (Hetherington, 1998; P. Norris, 1999). As a response, contemporary public administrators have been tasked with government "reinvention" as a way of increasing bureaucratic effectiveness and efficiency (Osborne & Gaebler, 1992). Some scholars have begun to view information technology as a critical component for creating a more capable government, one capable of providing better service and thus increasing citizen confidence in public-sector management (Norris, 2001). Electronic government (e-government) has in recent years attracted much attention as scholars have suggested that by leveraging cutting-edge information technology, government may reap benefits of increased efficiency, effectiveness, and citizen communication with public-sector agencies (C. Chadwick & May, 2003; Ho, 2002; Melitski, 2001; West, 2004). E-government can be defined as the implementation of information technology to supply services between public-sector agencies and citizens, businesses, employees, and other nongovernmental agencies (Carter & Belanger, 2004). E-government offers potential impact on the business of government in two fundamental, yet crucial, ways: by improving service delivery, including costs, and by improving communication between citizens and government (Fountain, 2001). Participatory forms of e-government, such as online public hearings or e-voting, are less common than informational uses or online transactions, such as tax e-filing. Carter and Belanger note that public-sector agencies at all levels of government have leveraged e-government applications to foster buying goods and services, the dissemination of critical information, and the acceptance of bids and proposals (General Accounting Office [GAO], 2001). Arguably, both the public sector and the citizenry benefit from the implementation of e-government services. As public-sector agencies reduce costs and improve efficiency, citizens receive quicker, better aligned services from a more focused and streamlined government (Kettl, 2000).

## BACKGROUND

While a large number of research studies have been conducted that analyze how public-sector organizations use information technologies for internal operational needs (Bretschneider & Wittmer, 1993; Nedovic-Budic & Godschalk, 1996; Norris & Kraemer, 1996; Pandey & Bretschneider, 1997; Ventura, 1995), and more current studies have been published that document the increase in e-government program development (Cohen & Eimicke, 2001; Fountain, 2001; Ho, 2002; Moon, 2002; Thomas & Streib, 2003), few studies focus on the question of what organizational and environmental factors drive the decision to adopt e-government features and online services. Though this research is newly conceived, the desire is for public administrators to have a reliable model from which government agencies can more fully understand what impels citizens to adopt a specific e-government application or service. Clearly, while the body of knowledge regarding e-government is burgeoning, the focus is nebulous and generally lacking in substance regarding the impact of e-government on public organizations. The lack of a rigorous model from which to measure the impact of e-government programs on public organizations represents a methodological lapse in the existing body of knowledge.

In recent years, scholars have worked to frame the new field of e-government by applying well-founded and accepted theories. Jain (2004) cites Scholl as applying stakeholder theory to analyze e-government; in addition, Jain discusses the application of network theory (Bardach, 2002) in the examination of public-sector collaboration via information technology, as well as the use of diffusion-of-innovations theory (Lazer, 2002) as a tool to understand the value information technology can offer leading-edge public-sector agencies. Additionally, various scholars have leveraged the research on user adoption of electronic commerce or e-commerce (Carter & Belanger, 2004;

Gefen, Elena, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2002) to conduct research analyzing the foundational elements directly influencing citizen adoption of e-government services (Warkentin, Gefen, Pavlou, & Rose, 2002). Although e-commerce and e-government differ with respect to access, structure, accountability (Jorgensen & Cable, 2002), and mandatory relationships (Warkentin et al.), e-commerce models can be utilized to analyze the adoption of online services in the public sector (Carter & Belanger).

By leveraging the widely accepted technology acceptance model (TAM), developed by Davis (1989), various researchers have suggested a role in the user acceptance of e-commerce in the private sector (Belanger, Hiller, & Smith, 2002; Carter & Belanger, 2004; Gefen, Elena, et al., 2003; Gefen & Straub, 2000; Moon & Kim, 2001). The TAM is comprised of variables designed to measure the acceptance of software applications by an organization's employees. Carter and Belanger note that these measures have been studied and proved valid for users of varying skill sets and for multiple applications, as well as for gender (Chua, 1996; Doll, Hendrickson, & Deng, 1998; Jackson, Simeon, & Leitch, 1997; Karahanna & Straub, 1999; Venkatesh, Morris, Davis, & Davis, 2003). Similarly, Carter and Belanger document that several studies have also used TAM to evaluate user adoption of e-commerce (Gefen, 2000; Gefen, Elena, et al.; Moon & Kim). Considering the similarities between e-commerce and e-government, the constructs used to study e-commerce adoption are also applicable to e-government adoption (Carter & Belanger; Warkentin et al., 2002).

Additional research has been conducted in the area of the Web trust model (WTM). According to a 2003 survey conducted by the Council for Excellence in Government (CEG, 2003), citizens possess a firm grasp on the potential benefits that e-government could bring to the public sector, but they have "concerns about sharing personal information with the government over the Internet, fearing that the data will be misused and their privacy diminished" (p. 2). Carter and Belanger (2004) note that privacy (Hiller & Belanger, 2001; Hoffman, Novak, & Peralta, 1999) and security (Belanger et al., 2002; S. Chadwick, 2001; GAO, 2001) are recurring issues in e-commerce and e-government research. As noted by Lee and Turban (2001), a citizen's decision to actively pursue the use of online government services requires that the citizen trust the government agency providing the service, as well as trust the Web-based technology utilized to accomplish the transaction. In this vein, newly published research (Gefen, Rose, Warkentin, & Pavlou, 2005) investigates the impact of trust in information-technology adoption in diverse cultures where divergent concepts of socially acceptable behavior exist. To accomplish this analysis, this study (Gefen, Rose, et al., 2005) compares trust-related perceptions of electronic voting between the United States of America and the Republic of South Africa.

However, a recent research proposal by Mete Yildiz (2003) offers an opportunity to examine the motivations of e-government from an institutional-theory perspective. Arguably, from the vantage point of the public organization, the use of institutional theory affords the prospect of understanding the initiation of e-government projects and the impact of these projects on the government agency. Institutional theory aids in the understanding of organizational reactions to conventions of the institutional environment. Thus, institutional theory requires the inclusion of components of decision making such as concerns of legitimacy, stability, and survival (Meyer & Rowan, 1977). After cautioning the use of the "measures and methods of the institutional theory, since it is argued that the theory itself has not institutionalized yet" (Yildiz, p. 2), Yildiz argues that institutional theory may aid public-management scholars and practitioners in the understanding of e-government programs in public agencies. Yildiz suggests that from an "institutional theory perspective, government organizations go online because of legitimization needs and resulting isomorphic pressures" (p. 3). DiMaggio and Powell (1983) write of three main types of isomorphic processes: coercive, mimetic, and normative.

According to the coercive isomorphic process, public organizations have adopted and implemented e-government programs as the result of a pointed managerial directive and/or as a result of unofficial pressure by other public-sector organizations that have already begun an e-government program. In the coercive model, the decision to implement e-government would be made by political appointees and career civil servants for reasons of perceived legitimacy and anticipated efficiency. Using the mimetic isomorphic process, public organizations mimic other successful and legitimate public-sector organizations. Yildiz notes that by imitating these other organizations, which already use e-government successfully, "they enhance their legitimacy by demonstrating that at least the organization is trying to improve the conditions of its service and/or information provision" (p. 3). And lastly, using the normative isomorphic process, public organizations use e-government due to the "newly emerging professional norms of public service—online interactivity, virtual service, transparency and accountability" (p. 4).

## FUTURE TRENDS

The systematic implementation of online public-sector services is proving to fundamentally change the way citizens and businesses interact with government. E-

government offers a significant potential in seeking innovative ways to reach the ideal of government as being of people, by people, and for people. The scope of this article was to analyze theoretical foundations used in the study of e-government and, through this assimilation, bring to light a lesser discussed model for understanding e-government adoption: institutional theory. A wide variety of theoretical models have been employed in the study of e-government: from the use of stakeholder theory (Scholl, 2001) to the utilization of network theory (Bardach, 2002), as well as diffusion-of-innovations theory (Lazer, 2002), the TAM (Gefen, Elena, et al., 2003; Gefen & Straub, 2000; Moon & Kim, 2001), and the WTM (Belanger et al., 2002; Gefen, Elena, et al.; McKnight et al., 2002). Much of this research is newly conceived and is being driven by the desire of researchers to develop a systematic, valid, and reliable model from which government agencies can more fully understand what impels citizens to adopt a specific e-government application or service. It is therefore suggested that the use of institutional theory provides a basic view for guidelines and frameworks that address e-government adoption.

## CONCLUSION

Leveraging institutional theory should also conceptually give impetus for resources that enable e-government's planning, design, and implementation through reviewing the primary factors impacting citizen adoption. Specifically, the following research questions, adapted from Yildiz (2003), can be employed to guide research into e-government adoption. How are e-government projects initiated in a government organization? Which problems do e-government programs aim to solve? Who are the actors in the e-government agenda-setting processes? How do these actors affect e-government agendas? The issues of public administration uncovered by e-government need to be analyzed systematically and further studied, especially in the electronic, digital, and virtual world in which scholars and practitioners in this field are currently working. There is no doubt that e-government impacts bureaucracy in various ways. However, there exists a pitfall that public-sector organizations could embrace the approach of utilizing e-government to achieve organizational transformation; this approach views e-government as providing curt answers to complex organizational and cultural issues (Li, 2003). The employment of institutional theory affords a framework from which scholars and practitioners can begin to understand the initiation of e-government projects and the impact of these projects on the government agency.

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## KEY TERMS

**Diffusion-of-Innovations Theory:** Used by Lazer (2002), the diffusion-of-innovation theory is the process by which an innovation is communicated through certain channels over time among members of a social society. According to Rogers (1995), an innovation is an idea or object that is perceived to be new.

**E-Commerce:** The use of communications technologies (such as Web-based technologies) for the conduct of business and service-delivery transactions while leaving internal or external business processes substantially unchanged.

**E-Government:** The transformation of internal and external business processes toward customer centricity based upon service-delivery opportunities offered by new communication technologies (such as Web-based technologies) to better fulfill the purposes of government to provide efficiency and effectiveness as well as fairness and equitability.

**Institutional Theory:** Used by Yildiz (2003), institutional theory helps us to explain the ceremonial conformity to rules and trends of the institutional environment. It necessitates the incorporation of bounded-rational and social aspects of decision making such as concerns of legitimacy, stability, and enhanced survival prospects.

**Network Theory:** Used by Bardach (2002), network theory refers to the analysis of social networks as a key technique in modern sociology, anthropology, social psychology, and organizational studies, as well as a popular topic of speculation and study. Research in a number of academic fields has demonstrated that social networks operate on many levels, from families up to the level of nations, and play a critical role in determining the way problems are solved, the way organizations are run, and the degree to which individuals succeed in achieving their goals.

**Stakeholder Theory:** According to Scholl (2001), the stakeholder research tradition began to unfold in the wake of R. Edward Freeman's book *Strategic Management: A Stakeholder's Approach*. Freedman demonstrated in a comprehensive fashion that the strategic management of private-sector firms could become much more effective and efficient if managerial efforts regard various stakeholders' concerns. In other words, shareholders benefit long term if other legitimate interests in the firm do not fall by the wayside.

**Technology Acceptance Model (TAM):** TAM is an information-systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it, notably, about its perceived usefulness and perceived ease of use (Davis, 1989).

# Third World City in the Information Age

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## INTRODUCTION

It could be one of the great paradoxes of history that the third world continues to urbanize itself at a faster pace than the developed world. At the same time, third-world cities, inevitably at the cost of the rural areas, continue to play the game of one-upmanship in proclaiming themselves the best possible hub of the information and communication technology (ICT). Such a phenomenon is natural not only because in the third world the cities are the privileged sites or spaces in which any new and progressive process or event is supposed to take root but also because the cities, the firm favorites of the policymaking elite of the third world, are supposed to be the privileged channels in the trickle-down process of development. In this process, the hinterland (the suburbs and the rural areas, mostly in that order) fall behind. Thus, a veteran scholar of third-world urbanization, T. G. McGee (1971), described third world cities either as "enclaves" (spaces meant for the elite's games surrounded by "hostile peasantry") or as "beachheads" (centers of modernization and catalysts for economic growth) (p. 13). However, cities in the third world are not monolithic entities enjoying exclusive occupation by elites and other privileged sections of society. Our real-life experience shows that third-world cities that are inhabited by nearly one-third of the world's urban population provide classic and shocking contrasts in terms of playing host to affluent, powerful citizenry on the one hand and to their underprivileged, powerless counterparts—ordinary people (the middle-middle/lower-middle classes downward) on the other hand. The latter, at best, possess only the legal attributes of citizenship, and, at worst, they are devoid of even that to remain utterly marginalized if not pulverized. It is in this setting that the third-world city opens itself up to the information age and its concomitant: digital governance.

This article limits itself to drawing attention to the fate of the third-world city caught in the vortex of the information age and the associated rhetoric of salvation. In the process, it reveals certain general indicative trends. It does not provide any fixed blueprint for immediate crisis solving, keeping in mind the variety that exists in third-world cities despite a substantial degree of commonality among them. However, it does endorse the view (Visvanathan, 2001) that to "understand … spaces being continually defined by development we need sharper tools for the analysis of symbolic space and the interrelationship between historical events and social phenomena, which bring space, time and culture together" (p.182).

## BACKGROUND: INFORMATION REVOLUTION AS SOCIAL REVOLUTION

The information age might have been initiated and propelled through spectacular technological breakthroughs, but it goes beyond the technological confines to have immense impact on the lives and lifestyles of people across social echelons (Robins & Webster, 1999). With the onset of globalization, which compresses space and time like never before, the policymaking elite of third-world countries dreams of harnessing its power to create an information society. As it is, in the information society, the socialization of technology is a must in order to put its power and to reach to the service of the people. This is what makes the information revolution a social revolution in the fundamental sense. What is seen, however, as Scott Lash (2002) so directly puts it, the information society turns into the "Disinformed Information Society" (pp.141-155). Obviously, the state has a key role in such a design in terms of its stress on thrusting an information society on the people without adequately promoting the communicative dimensions (Sinha, 2005).

Referring back to ordinary people in the third world, they continue to be marginalized and even pulverized. It is despite this fact that in almost all third-world cities (e.g., Kolkata [previously Calcutta], Mumbai [previously Bombay], Delhi, Dhaka, Karachi, Rio de Janeiro, Johannesburg, etc.), a substantial percentage of prime urban land/space is occupied by the less privileged segments. Such occupation can be found in various forms, such as pavements, public parks (originally planned for the privileged), bus terminals, railway stations, government precincts, or, for the relatively fortunate ones, *bustees, jhupries*, *favelas*—slums and shanties. Thus, one finds a widespread urban schizophrenia in the cities. However, what is more alarming, as I have demonstrated (Sinha, 1989) in the case of Kolkata, policymakers remain largely ignorant and indifferent about it. The following statement on the city-regions in the developing countries confirms this point:

*[T]he population of global city-regions are almost highly segmented in terms of social class (and) income. ... These city-regions then assume spatial forms that express ... segmentation of the rich and poor. At one extreme, one finds massive poor communities living in shantytowns,* favelas*, and* bidonvilles*, and at the other the more spacious and well-equipped communities of the middle class and the rich. ... This architecture of fear only exacerbates the fragmented character of the urban space, and generates additional problems.* (Scott et al., 2001, p. 25)

Being partially if not completely devoid and deprived of many basic amenities in life, cities in the third world with loads of ordinary people now are waiting to be catapulted to the status of what Manuel Castells terms an *informational city*. It happens amidst the hype generated by third-world rulers as well as the media that the information age is a sort of magic wand (Sinha, 2004). The magic wand is supposed to end the hitherto existing discriminations, deprivations, and exclusions. In short, the urban third world is expected to benefit immensely from the much-publicized marriage of good governance and digital governance. It particularly happens when the information revolution is conceptualized and sought to be implemented technocratically and technologically, keeping the vital issue of social negotiations out of sight. The wrong can be corrected to a considerable extent if the information revolution is treated fundamentally as a social revolution and as one stage of social development. This would demand extensive organizational innovation and restructuring. But it calls for the change in the mindset of the ICT-happy third-world policymakers, as well. For a good beginning, they might try to be conversant with the concept of informational city.

## INFORMATIONAL CITY

The information age acquires importance because the steady and rapid expansion of ICT has been a constitutive element of the globalization of capitalism, often specified as information capitalism. This leads to the point that information today has shifted to a higher status—from being a facilitator to commodity production to being a key commodity. How, then, do ordinary people in a third-world city confront this problem? A lead can be found in the way Castells (1989) conceptualizes and theorizes the informational city.

Castells (1989) defines the informational city as an urban system with sociospatial structure and dynamics determined by a reliance of wealth, power, and culture on knowledge and information processing in global networks, managed and organized through intensive use of ICT. But it is only one side of the coin. He simultaneously points out that the informational city is a dual city. Dual city, in Castells' perception is an urban system socially and spatially polarized between high value-making groups and functions on the one hand and devalued social groups and downgraded spaces on the other. The politics of a third-world city vis-à-vis the information age can be explored more specifically from these twin referents.

Ari-Veikko Anttiroiko (1999) incidentally refers to a number of items of the informational city Management, of which a select few can be mentioned for providing a more concrete scenario:

- **Main Premises:** Globalization and the information mode of development; informationalism and new welfarism; managing aspects of risk society.
- **Overall Objectives:** Welfare and quality of life; equality and equity; sustainability and diversity.
- **Operational Objective Area:** Thriving local and regional economy; strengthening human and social capital; attracting external resources; efficient and cost-effective administration.
- **Strategic Tools:** Better innovativeness; efficient utilization of institutional resources; creativity and utilization of human and social capital; informational urban policy lines.
- **Informational City Management Techniques:** New concept of informational city management; networking and creative alliances and partnerships; enhancing local investment and empowerment; city marketing and place promotion; management support systems.

Before we go more deeply into Castells' (1989) depiction of the informational city to extract its political implications, it is important that we refer to his earlier and classic work, *The Urban Question* (1977). In it, Castells produced two senses of urbanization: first, as a spatial concentration of a population on the basis of certain limits of dimension and density; and second, as a diffusion of a system of values, attitudes, and behaviors—by the name *urban culture*. While to Castells, the notion of *urban* relates to the ideological dichotomy between traditional and modern society, in his scheme, the process of urbanization, linked with the development problematic, relates to technological and economic level, to process as qualitative transformation of social structures, and to ideological function in the form of structural change presented as accumulative movement of technological and material resources of society.

No less significant is the fact that, with this backdrop, in *The Urban Question*, Castells also introduced and elucidated the concept of *collective consumption* (a concept of fundamental importance along with the concept of *reproduction of labor power*), which refers to forms of

services (e.g., mass transport, housing, health facilities) collectively provided generally by the state. Castells, in fact, established a link between collective consumption and political mobilization, which lies at the basis of urban social movements (e.g., squatters' movements, tenants' movements, etc.), aiming to challenge the existing nature of collective consumption, if the need arises, for purpose of improvement. Castells floated the concept in the particular context of labor force on which the capitalists depend for production of commodities.

However, there is reason to develop a critique of Castells' propensity to focus on the concept of collective consumption, somewhat at the cost of the process of production. The latter carries much relevance in the third-world context, which has been well explicated by scholars like Lojkine(1976) and Harvey(1973). But, with some degree of liberty, one can stretch the concept of collective consumption to include the ordinary people referred to here. One can do this on two grounds: (1) the concept refers to the collective use of certain services that also have something to do with the quality of life of individuals and with the role of the state in organizing and running the various forms of collective consumption; and (2) for a long time, this resembled the scenario in the third-world cities. A major criticism against Castells could be that the concept of collective consumption is less relevant in the case of the Western-developed states that also have large private provisions of consumption. By the same logic, the concept retains its validity in the third world. However, with the coming of the information age, the concept, which is rooted in the ideas of state welfare, was in need of revision. Castells seemed to have realized this as much as his critics, particularly Saunders (1986), who is best known for his dual state thesis. Saunders (1986) made incisive analysis of the advent and centrality of consumption practices as a reference point of urban inequality by explicating the growing split between those who can afford to purchase their services from the market and those who continue to depend on state welfare.

## INFORMATIONAL CITY AS DUAL CITY

The information age, which is based on a distinctly new mode of production and a new form of organizing power, is not without its share of risk, uncertainty, and unpredictability. Saskia Sassen (2000) refers to the "new geography of centrality and marginality" (pp. 267-280) in this context. In Sassen's scheme, the new global economy in effecting centrality binds the cities, especially the downtowns and metropolitan business centers, of the developed and the developing world, particularly through financial markets and transactions in services and investments. On the other hand, low-income city areas continue to sink. The disparity, according to Sassen (2000), is even more evident in the contrasting pictures of workers, with highly educated workers witnessing a steady rise in their incomes and low- and medium-level workers facing steady declines and disasters.

As Castells views it, the lifelines of the information age—the space of flows and networking—produce revolutionary changes, but the changes, by their very characteristics, give rise to tension created by the conflict of personal well-being and social alienation, individual fulfillment, and social disintegration. Space of flows refers to different centers linked in information space through electronic networks. Networking relates to governance based on the use of flexible linkages organized by information technology. The two give rise to a flexible form born out of placeless logic and functional footlooseness of the network state within the framework of which the government works in more and more collaboration with other governments and supranational institutions. The institutions of society and governance, particularly in third-world countries, face the unpredictability factor head on. They fail to keep pace with the changes thath find their highest expression in the global financial market—a virtual automate, in Castells' description—that affects everybody by doing things by itself without knowing why it does it. A direct and evident outcome of it can be found in the dismantling of traditional organization and patterns of work marked by stability, and the rise of various networks resting on temporary, contractual work in which individuals are constantly on the move by shifting jobs, tasks, and assignments.

With such sweeping change being inevitable, it is expected that the information age only would cause the decline of collective consumption through advocating decline in planning, thus facilitating the dominance of the market mode and privatized modes. All these are part of the process in which there is a perceptible shift from social redistribution to promotion of capital accumulation, from politics of legitimation to domination, and greater expansion of the capitalist system by accelerated internationalization of economic processes. This, in turn, creates a great cleavage between those who can afford to go by the market mode and those who are left behind to stick to the collective consumption, however emaciated it might be. When Castells theorizes on the informational city as a dual city, he has this cleavage in mind. His treatment is not superficial. As Castells explains in his reference to New York City as the dual city, it does not simply mean opposition between executive limousines and homeless people. More fundamentally, it represents an urban social structure that exists on the basis of interaction between opposite and equally dynamic poles of the new informational economy, whose developmental

logic leads to polarization of society and its social groups, creates segmentation in labor forces and occupation, isolates cultures, and segregates the uses of a shared space.

One does not have to stretch one's imagination too far to realize the graver consequences of this cleavage in the third world (cities) in which it acquires an extreme form. To quote Castells: "There will remain switch-off, wireless communities, still real people in real place, yet transformed into urban shadows doomed to haunt the ultimate urban dream of new technology" (p. 19). Castells' observation finds echo in Mike Davis (quoted by M. Irvine):

*The contemporary city stimulates or hallucinates itself in at least two decisive senses. First, in the age of electronic culture and economy, the city redoubles itself through the complex architecture of its information ... networks. ... If so, urban cyberspace—as the simulation of the city's information order—will be experienced as even more segregated, and devoid of true public space than the traditional built city.* (Irvine, n.d.)

Let us take the instances of attempted replication of the Silicon Valley in third-world cities. In terms of high-tech-sponsored spatial manifestation, such replication runs the risk of being a truncated and incomplete version of the original. Castells refers to the following five factors that led to the establishment of the semiconductor industry in Silicon Valley: (1) the presence of high-ranking universities with intense research orientation in general and in thrust areas like electrical engineering and computer sciences; (2) organized and proactive network of financial firms specializing in venture capital; (3) positional advantage as regional nodes center and nodal points in national and international network of telecommunications and air transportation; (4) pleasant environment and hosting of an industrial milieu beyond the confines of its own organization; and (5) the military market. The factors indicate that they are the products of a long tradition and exceptionally wide-ranging milieu of innovation that cannot be developed overnight in the city regions of the third world. On the other hand, it is a total package without any opportunity of being selective about its ingredients. In other words, either the third-world cities should have all such facilities in a very satisfactory, if not full-fledged, form, or they simply do not. The question is how many cities in the third world—already reeling under the strain of large-scale migration and associated problems like scarcity of livelihood, predominance of low-end, low-skill jobs and housing—are ready for a high-tech hub? The question calls for greater introspection because, as the preceding discussion shows, the difference between the thinking of being ready and being actually ready is the difference between the proverbial cup and the lip.

## FUTURE TRENDS

Urbanization policies, as one observer mentions, "have traditionally been negative in tone and intent" (Mohan, 1996, p.130). Add to it the inherent hierarchy that remains integrated to the third-world urbanization process in general and the third-world city in particular. Would not, then, the technocratic interpretation of the information age intensify the problem? One might argue that because such interpretation is couched with determination and optimism, the problem will go away. But let us assert that such technocratic optimism is part of the problem and not the solution itself. Only if its policymakers are ready to view the information revolution as a social revolution can they find possible and effective clues to establish a humane city with more equitable vision. The path is not very smooth. Then again, smoothness has never been a great attribute of urban management, as it always confronts urban politics not only in terms of physical control over physical urban space but also physical control over symbolic urban space, the latter being the instances of occupation or demonstration in prime locations in cities for a temporary period for a show of strength. The way forward, though strewn with challenges of complex nature, is to reinstate and reiterate the political, as expressed through reciprocity, conviviality, solidarity, cooperation, and not the least, simultaneously pursued competition and contest, which is a process through which challenges and negotiations emerge and sustain themselves amidst contradictions and dislocations that mark the urban scenario in the third world, in particular. Services like housing facility, sanitation, sewage, drainage and garbage removal, and public transport concern the efficient or inefficient nature of urban management. But the question is how can citizens demand a better deal in these services, if they are found in pathetic state?

The demand for the aforementioned services in the improved and better form—in the form of socially and environmentally sustainable sanitation, sewage, drainage and garbage removal and public transport—would need social struggles and protests and movements of segmented collectives of ordinary people. It could be evident in putting up roadblocks, organizing meetings and processions, or even making collective representation to the friendly or not-so-friendly city councilor by people of different neighborhoods and/or social strata. It also requires greater attention of the powers-that-be to the citizen-centric political process and greater receptiveness to criticisms and protests. All of these provide the clue that rather than being over-enthusiastic about the inherent powers of the information revolution, the need of the hour is to adopt a stance by which the technological marvels of the revolution could be integrated and recon-

ciled with more material aspects to improve the quality of life of ordinary citizens.

In addition, the local institutions, both public and private, have a key role here, but then again, they are facing tremendous challenges. There is little doubt that ICT has an intimate tie with the hyper-mobile global capital, the modus operandi of which calls for withdrawal of subsidy and weakening of public service provisions and the social sector (e.g., housing). This, as observed by scholars (Logan & Molotech, 1987), is leading to severe erosion of the autonomy of cities all over the world (including developed countries). Thus, when one thinks in terms of (urban) development in the third world, one has to rethink the locality (Peterson, 1981) in light of these new developments. It is known widely that local governments in the third world generally are weak, if at all in existence. This, from the very foundation, subverts any possible initiatives to reconcile the technological with the existing political, economic, social, and cultural milieu. However, the following excerpt, taken from a booklet titled *Are you a Councillor? This Booklet is for You* (2001), reveals that there are some attempts at the local governmental level in the urban third world to reconcile with the new reality. The excerpt shows how the elected councilors of the municipalities, the urban local body meant to administer towns, are provoked to be acquainted with ICT (more specifically, computers) in order to serve their constituencies better. The excerpt reads:

*It goes without saying, if you need to make use of a technology to the fullest, you need to be familiar with it. ... You might ask, "I don't know how a computer works." ... In reality, it is not a very difficult proposition. Leave out the examples in developed countries; some of your colleagues have learnt this technology quite well within a few days. They too did not know the basics of computers. ... Even then if you fear you are not confident ... ask for training.* (p.8)

In indicating the councilors' political positions, power, and responsibilities, the brochure concludes in this dramatic vein:

*Whether you want to continue as subservient to the traditional system in the future or assert your own rights to fulfill the genuine expectations of your electorate, the final decision is yours.* (p.8)

Such efforts need to be imparted a more broad-based character beyond the confines of the councilors. To initiate such process in more concrete terms, the imperative is to integrate a movement for technology literacy (developing the power to understand and analyze technology in terms of its positive and negative impacts) with social movements. It is unfortunate that in third-world countries, where one would find the existence of many kinds of social movements, none really goes for such integration.

## CONCLUSION

The preceding discussion, among other things, reveals the problems with the technocratic orientation of policymaking in a specific context—the deployment of ICT in the (third-world) city. Keeping in mind that technocratic rationality tends to undermine political rationality, de*myth*ifying and demystifying the information revolution through the socialization process mentioned earlier become urgent tasks. It is needed particularly in order to prevent the third-world city, which is still a space for the struggle for existence and emancipation, from being thoroughly depoliticized and from becoming a bottomless pit. It definitely involves a long and arduous struggle, but only such integration can, in turn, make both the policymakers and the people aware that the question of ICT is not simply a technological issue insofar as providing dignified and humane living to the ordinary people of the third world. It is, first and foremost, a social, cultural, economic, and political question.

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## KEY TERMS

**Disinformed Information Society:** Mainly developed by social theorist Scott Lash, it refers to a cultural development made up of unintended consequences of the informationalization, which makes information ubiquitous and spins it out of control. It also leads to overload of communications, thereby subverting many of the promises and prospects of the information society.

**Dual State Thesis:** Attributes two functions of the State—(1) social investment, which aims at maintenance of goods and services in the economy with support to the profitability of the private sector firms and (2) social consumption, which supports the consumption needs of diverse groups that cannot fulfill their requirements through the market.

**Information Age:** An era marked by the advent of information as a primary resource/commodity, guided by information flow, with the consequences of spatial and temporal compression, disembeddedness, and real-time relations.

**Informational City:** An urban system with sociospatial structure and dynamics determined by a reliance of wealth, power, and culture, and on knowledge and information processing in global networks managed and organized through intensive use of ICT.

**Information Mode of Development:** The resultant change guided by development ICT-mediated communication, which contributes to radical reconfiguration of institutions and processes.

**Information Revolution:** The transformation in the nature of information, propelled by that of technology (beyond the earlier focus on the silicon chips and based on the later focus on the economic, social, cultural, and political dimensions of information and communication technology) with extensive and intensive impact on society.

**Information Society:** Primarily theorized as a post-industrial society marked by the centrality of knowledge-based services, as distinct from the industrial society in which production of goods held center stage.

**Third World:** The underdeveloped and developing countries/societies of Asia, Africa, and Latin America. The term is shorn of its pejorative connotations here.

**Trickle-Down Process:** A process characterized by the gradual diffusion, penetration, and percolation of the changes occurring at the top of the layer (in this case, the upper crust of society/economy/polity) to the lower level.

# Third-Generation Local E-Government

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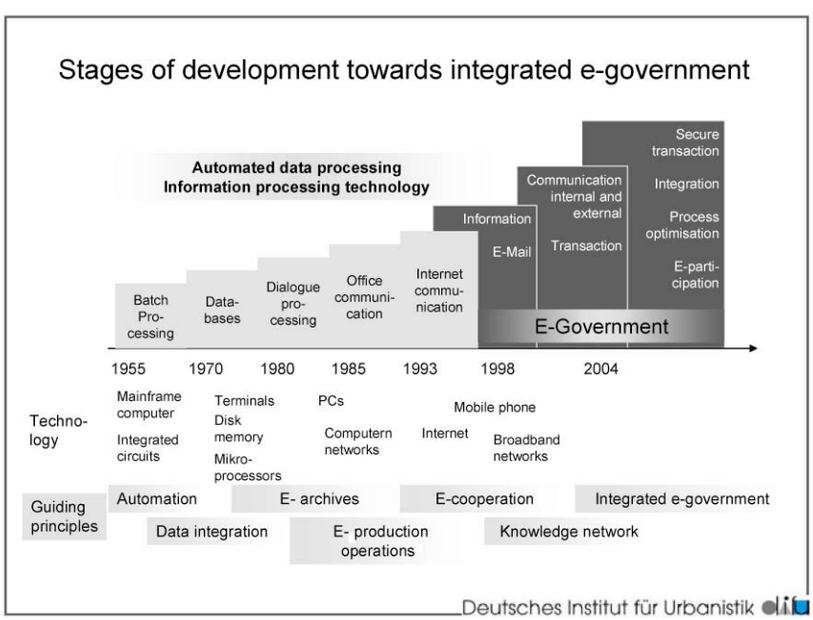
## INTRODUCTION

Local e-government reflects an ongoing process of modernization. Like all processes of innovation and modernization, the development of e-government is also characterized by various phases and cycles. These phases of development are fundamentally similar, whether they are implemented in a country that is a pioneer of e-government or a country that is among the stragglers in the electronic modernization of the administration. As to the specific mechanisms, the obstacles and the driving forces of modernization vary from one country to another. At the same time, there are differences in the introduction and development of e-government between the different levels of government. National e-government strategies and possibilities are subject to different conditions than a local e-government. The national differences and the differences between various levels of government depend on factors such as the state constitution, the institutional circumstances, work cultures, modernization strategies, IT equipment, Internet access, or financial resources (Drüke, 2005b, p. 286-291; Eifert, 2004; Socitm & I&DeA, 2002, p. 8). This is important as a preliminary remark for the limitation in the scope of this study, which is focused on Germany and specifically the local government level. However, these perspectives are naturally reflected in the international discussion about good e-government.

## BACKGROUND[1]

Before the idea of third-generation local e-government is presented in detail, the historical background and the preceding discussion of e-government in Germany must be considered. The term "e-government" originated in the English-speaking countries and has been used in German-speaking countries only since the second half of the 1990s. Since then, Administrative Science and Administrative Computer Science have tried to provide an authoritative interpretation of this artificial term. At least among German-speaking specialists, agreement has largely been

*Figure 1. E-government development stage model*



reached on a comprehensive understanding. According to this view, e-government includes *all* aspects of government and administration (public policy formation, decision-making, creation and provision of services, public participation)[2] insofar as they can be supported and enhanced by the use of information and communication technology.

So this definition follows on from the considerations and descriptions of potential from the boom era of computing in the administration, some of which were very far-sighted even then: "In future, information technology is likely to cause far more fundamental questions to be asked about the citizen-related tasks of the administration" (Reinermann, 1987). The phrases "automated data processing" and "information processing technology" were coined in the early days of computing, and they are still used alongside the term "e-government" which is so popular and therefore so eroded by constant use.

The creation of the term e-government not only marked the rise of a fashionable "Americanism" in the discussion in German-speaking countries. Instead, it represents a step across the threshold toward a new quality in the use of ICT technology in the administration, marked by the use of the Internet—today mainly in the Internet applications www and e-mail. New technical opportunities have arisen which are quantum leaps in comparison with earlier computer systems both within the administration and in contacts with the citizens. Here are just three factors:

- The internal computer networks of the administration have interfaces to the computers used by the "customers" of the administration; direct data exchange is therefore possible.
- E-mail communication allows asynchronous exchange between partners in the administration, politicians, citizens, and business people.
- Different computer systems are made compatible by "middleware" and established standards and protocols for data exchange; electronic communication and transactions can take place "across platforms."

At the end of the 1990s, the use of the Internet by local communities was mainly limited to offering information on their Web sites—it was no accident that many municipal Web sites were referred to as "municipal *information* systems." This first generation of local e-government was gradually replaced by the second generation in which the provision of information itself was supplemented by communication and transaction services: by the provision of forms on the Internet, by participation facilities on local community portals—a term which has increasingly replaced the "*information* systems"—or by the possibility of electronic interaction and transaction services. The speed with which e-government of the second generation has spread is very varied; pioneering municipalities and regions, such as those involved in the MEDIA@Komm model projects in Germany[3], which were documented in other countries, for example, in Drüke (2005a) and Socitm & I&DeA (2002)—have made considerable progress, whereas most other local communities still only provide information services.

## TOWARD THE THIRD-GENERATION E-GOVERNMENT

If supplementing information and communication services by transaction services is described as e-government of the second generation, what is the third generation? What are the fundamentally new characteristics of the next generation of e-government? What are the decisive questions and features in the transition from one generation to the next?

In the phase of transition from the second to the third-generation e-government, innovations and individual solutions are beginning to grow together as integrated and consolidated implementation concepts. So the third-generation is not only characterized by a "higher level" of the use of electronic media, it also involved consolidation processes and integration at different levels.

Each "phase transition" is a time for important and decisive steps: knowledge gained from experience gives rise to new questions (cf. next section), and new positions and insights in academic theory and practical municipal solutions are discussed in preparation for the next phase.

Before the distinctive features of the third-generation of e-government—"integration" and "consolidation"—are subjected to closer scrutiny, we must describe the way e-government is embedded in the cycle of innovation which is characterized by the introduction and application of ICT technology in a networked society; for more detail, see Lenk and Traunmüller (1999, p. 21-51), Castells (2000, p. 38-60), and other sources quoted there (cf. Figure 1).

The first visible attempts to develop the third-generation of local e-government in Germany are so far only apparent in selected pioneer regions and cities such as Hamburg and Bremen. Good examples of such pioneers in Europe, the USA, and Canada can be found in Drüke (2005a), Hagen and Kubicek (2000) and Traunmüller (2003).

When we speak of "integration" as a characteristic feature of the third-generation e-government, this means:

- Grouping of e-government services by life situations or concerns.
- Integration of electronic information, communication and transaction services.
- Integration of different options to contact the administration (citizens' office, phone/call centre,

Internet, e-mail, UMTS, etc.) (i.e., "multi-channelling")
- Internal integration of front-office and back-office so that processes are implemented electronically without discontinuity of media by the online portal where appropriate, even including specialist applications
- Integration of applications reaching beyond the local community (horizontal integration) and data exchange with national or federal state organizations (vertical integration)
- Integration of technology and organization by business process optimization
- Technical integration (e.g., by the use of powerful e-government platforms taking into account the relevant e-government standards and other widespread standards)
- Integration of the main modules which must be implemented to achieve successful local e-government (success factors)

The different forms of integration represent an immense challenge to the administration and can only be implemented step by step. At every step, care must always be taken to ensure that options for subsequent integration stages are not blocked.

Another characteristic of the third-generation e-government is that legally binding electronic transactions must be possible. According to the current legislation in Germany, a verified electronic signature is necessary for all cases in which the law requires that agreements must be made in writing. The countries of Europe have introduced different provisions based on the requirements of the EU directive on common conditions for the introduction of electronic signatures (European Communities, 1999).

Finally, using ICT and the Internet to improve participation by the citizens is also of central importance for the third-generation e-government. This goal still plays a subordinate role—compared with other goals—in practical use at the local communities. This should be changed in view of the necessity of developing the community of citizens and integrating citizen involvement in society; cf. the examples and possible fields of action in Traunmüller (2003, p. 43-84), Drüke (2005b, p. 274), and Grabow (2004c).

It is obvious that process optimization is more than just a natural consequence—it is essential if technology and the organization are to be integrated—and that optimization must be preceded by a fundamental critique of the tasks. An exact implementation of the conventional administrative processes in the electronic world would be just as unproductive as correcting typing errors on the screen with correcting fluid.

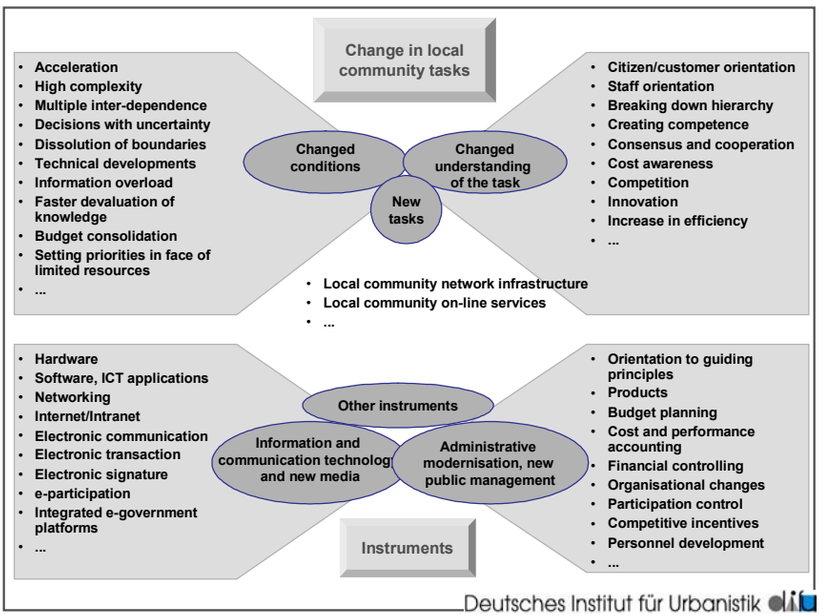
But it is not just a question of adapting the organizational processes. Instead, two fundamental and "revolutionary" modernization tasks should be combined: modernization of the administration (against the background of the guiding principles for the new public management) and e-government. Basically this means harnessing the "enabling" potential of ICT technology and the Internet for administrative modernization.

This use is all the more appropriate because of the many areas in which the changed general conditions for administrative action, certain concepts of administrative modernization and the characteristics of modern ICT technology and new media correspond to each other (cf. Overview 1). This cannot be explored in detail here, so we will focus on the concept of "acceleration" as an example: in general it can be observed that product cycles, industrial cycles and location selection cycles are increasingly accelerating. Speed is becoming a quality factor for locations, and in many municipalities this forces the acceleration of administrative processes and decisions. On the other hand, acceleration and speed are also inherent elements of the new information and communication technology and the Internet and part of their potential (automation, faster computers, fast electronic

*Table 1. The interdependence between the general conditions, the concepts of the modernization of the administration and the characteristics of new ICT technology and new media (German Institute of Urban Affairs; Grabow, 2004)*

| General conditions for administrative action and political decisions (selection) | Concepts of the modernization of the administration (selection) | Characteristics of new ICT technology and new media |
|---|---|---|
| • Acceleration/ growing dynamism<br>• High complexity<br>• Multiple inter-dependence<br>• Decisions with uncertainty<br>• Dissolution of boundaries<br>• Technological developments ⇔<br>• Information overload<br>• Faster devaluation of knowledge<br>• Setting priorities in face of limited resources | • Acceleration<br>• Parallelization of processes<br>• Leaner processes<br>• Breaking down hierarchy<br>• Reorganization<br>• Teamwork<br>• Open communication ⇔<br>• Cooperation<br>• Creating competence<br>• Innovation<br>• Increase in efficiency<br>• Competition | • Speed<br>• Parallel rather than sequential processes<br>• Reduction of complexity<br>• Networking<br>• Broad access to information<br>• Navigation aids in the information environment<br>• Self-organization<br>• Open network<br>• Informal communication<br>• Innovation |

*Figure 2. Changes in local community tasks and instruments (Grabow, 2004)*




communication, parallel processing instead of sequential processing).

On the whole, therefore, new ICT technology and media are forcing certain changes in the administration and the way tasks are carried out, and on the other hand their use is also encouraged by new approaches in the political sphere and the administration.

The reaction to the changed general conditions in local communities is a change in the understanding of tasks in the administration and the political sphere. Existing tasks are changing, new tasks are being added, old tasks are becoming disposable. At the same time, the guiding principles for the local community administration are changing (at least, this should be so in view of the current discussion on the modernization of the public administration); the goals for a local community administration which meets the requirements of today are being redefined, in keeping with the concepts defined for the new public management. In Germany these goals were initially set in the new control model of the Joint Communal Association for Administrative Simplification (KGSt) of 1993, although some of the details have now been changed.

Of course, it must be noted that the process of modernization is only progressing in small steps and with mixed success in many municipalities and local communities. For example, it is rare for all elements to be completely implemented; in most cases, modernization initially covers only isolated areas. The undoubtedly sensible basic concepts encounter various difficulties in practical implementation, and in some cases they even have negative effects—which were predicted by some critics at an early stage. But this should not hinder us from using e-government as a catalyst to give new impetus to the process of administrative modernization where it has come to a standstill. "In a sense, e-government creates a second chance for administrative reform" (Drüke, 2005a, p. 4).

## FUTURE TRENDS

In the phase of transition to the third-generation e-government, which aims to give new impetus to administrative modernization and which, as mentioned above, is a time in which important decisions must be made, the step forward to a "phase of maturity" will not be possible without answering new central questions.

These questions include the following:

- How far can the administration and the political sphere be transformed by e-government in their structures, processes and functions?
- Is the guiding principle of integration of and by e-government compatible with the different federal structures which are especially strong in countries like Germany?
- Is the design potential determined by questions about the economic efficiency of e-government?

- What are the factors which demonstrably promote the success of integrated e-government?

Initial answers to these questions are given in the issue of the Deutsche Zeitschrift für Kommunalwissenschaften (German Journal of Urban Studies) focused on "Local e-government" (No. 2;/2004). Hill (2004) has formulated a clear position on the previous core theme (i.e., the extent to which e-government) as a comprehensive modernization project, is automatically linked with administrative reform. He even heightens and extends this question by speaking of transformation rather than modernization. He rightly suggests that e-government offers considerable transformation potential for the state. This means that centralized and decentralized services must be re-examined. The role of the citizen and the joint organisation of public affairs by the state, the business community and society should also be discussed afresh in the light of e-government. This also shows that current ideas about the future of (local) e-government must be extended, and that an all-embracing discussion of e-governance is necessary.

Integration, which is a major element of e-government of the third generation, also includes the integration of applications which reach beyond the local community (horizontal integration) and data exchange with national or federal state organizations (vertical integration). If we follow the arguments presented by Hill (2004), who suggested that the decentralized performance that is typical in strongly federal states such as Germany would need to be reviewed and possibly replaced by central "overlay" administrations, this would erode one of the basic principles of the division of responsibility in a federal state. But this apparent dilemma can be overcome by pragmatic solutions. Instead of centralization, Kubicek and Wind (2004) suggest standardization in data exchange. Although they suggest that the main responsibility for the slow progress in data integration lies with federalism and local community self-administration, they show that there are good examples of harmonization in practice. These examples show that there is considerable integration potential without calling the basic principle of federal government into question. Nevertheless, this leaves the problem that "retreating" to use harmonization of data exchange as the sole instrument for integration would fail to exploit the considerable potential savings that could be achieved by central provision of services (e.g., by joint organizations acting on behalf of the local communities).

After all, economic viability in the transition to the third-generation e-government is especially important in view of the shortage of local community finance. The search for potential savings is at the top of the political agenda, and this brings up several questions: Are there any practical ways to evaluate e-government from an economic perspective? Can the further development of e-government be recommended from the point of view of economic efficiency? If both questions are answered with "Yes," does a judgement based on economic considerations lead to the right decisions, or does it in fact jeopardise the goal of the "common good?" The articles by Engel (2004) and Grabow (2004) show that discussion of these issues has only just begun in Germany. But even internationally, there seem to be very few cases in which greater insights have been attained: "In general there is little knowledge about the cost-benefit-relation, and this is severely felt as a huge gap by practitioners in the municipalities and political officials" (Drüke, 2005b, p. 276). It is obvious that far more research is needed on this subject.

But there are more answers when it comes to the success factors for integrated e-government. Whereas e-government of the second generation often only considers individual factors or solutions, the third generation is characterized by the fact that it takes the different success factors into account simultaneously at different levels and attempts to integrate them. "The long-term success of local e-government is determined in the last resort by far more factors than are often assumed. Online applications and their benefits are only one aspect. One of the main insights of Administrative Science on the subject of e-government is that the technology or the applications on their own are not the key to successful e-government. In fact, there is a whole range of factors such as organizational measures, strategic procedures, qualifications, communication, partnerships, obtaining resources, and much more." (Grabow et al., 2004). The success factors were identified, and a management concept was developed in the accompanying research to the German MEDIA@Komm model projects to offer local communities guidelines for their e-government developments.[4] The model of the success factors also serves as an evaluation grid for benchmarking in the development toward integrated e-government. It has been successfully used for an exemplary description and analysis of local e-government by reference to seven different countries (Drüke, 2005a).

## CONCLUSION

Even though this article had a double limitation in its perspective—the specific German view and the focus on local e-government—most of the points mentioned are equally applicable internationally and to e-government at all levels of the state. It is obvious that the most difficult step in the development of e-government is still ahead of us—integration at all levels including the expansion of e-government to constitute e-governance. Fundamental

decisions must be made. The discussion on the right approach is being conducted in many places. Especially in relationships with citizens and the business community, e-government of the third generation will lead to greater upheaval in the administration and the political sphere than was expected when the first municipal information systems were set up.

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## KEY TERMS

**Back Office:** This is the overall term for all processes and areas in a business enterprise or public authority which are carried out in the background for the citizen or customer and are not directly visible. It includes the internal processing of applications and queries received by the administration.

**E-Governance:** E-governance stipulates the rules and negotiating processes of all participants in the process of shaping society from the perspective of the special challenges and rules of the information society (ICT technology, Internet, new networks, etc.). Public e-governance describes the specific focus of the public sector.

**Front Office:** By contrast with the back office, the processes which take place in the front office are processes in public administrative transactions which are visible to the customer. The further steps of processing the customer's request then take place in the back office of the administration.

**Life Situation Concept:** Life situations are central life events such as work, birth, marriage, relocation, starting school (i.e., subject areas which require a variety of administrative services). The life situation concept aims to provide "one stop" services for these situations.

**Multi-Channelling:** For each administrative service, the suitable distribution channels are considered in each case (personal contact, citizens' advice office, letter, fax, telephone/call centre, Internet, e-mail). The aim should be to be able to address all of the electronic processes provided in the back office via various front end channels.

**Third-Generation E-Government:** E-government of the third generation is largely characterized by integration at different levels: the integration of electronic information, communication and transaction services, of the front office and back office, by data exchange between all levels of the state, technical integration, multi-channelling and integration-based consideration of all of the success factors,

**Verified Signature:** Verified signatures are generated with a secure signature generating unit and are issued by certification service providers which must fulfil certain legal requirements. The verified signature satisfies high security criteria, it is suitable for authentication and offers a high degree of conclusive force. In civil law it can replace a handwritten signature, and in public law it can replace the formal requirement of written form.

## ENDNOTES

[1] These considerations and the fundamental remarks on third-generation e-government are mainly based on the line of argument in Grabow (2004b).

[2] This definition is based on the explanation of the term in the memorandum "Electronic Government" compiled by the Administrative Computer Science Committee of the Computer Science Society (GI) and the Information Technology Society (ITG) in the Association for Electrical, Electronic & Information Technologies (VDE) (Informationstechnische Gesellschaft, 2000).

[3] Cf. the information on MEDIA@Komm in English under http://mediakomm.difu.de/en/index.php, in Drüke (2005b) and in Socitm & I&DeA (2002, p. 73-84).

[4] Cf. the information on MEDIA@Komm in English under http://mediakomm.difu.de/en/index.php, in Drüke (2005b) and in Socitm & I&DeA (2002, p. 73-84.

# Toward U-Government in Japan

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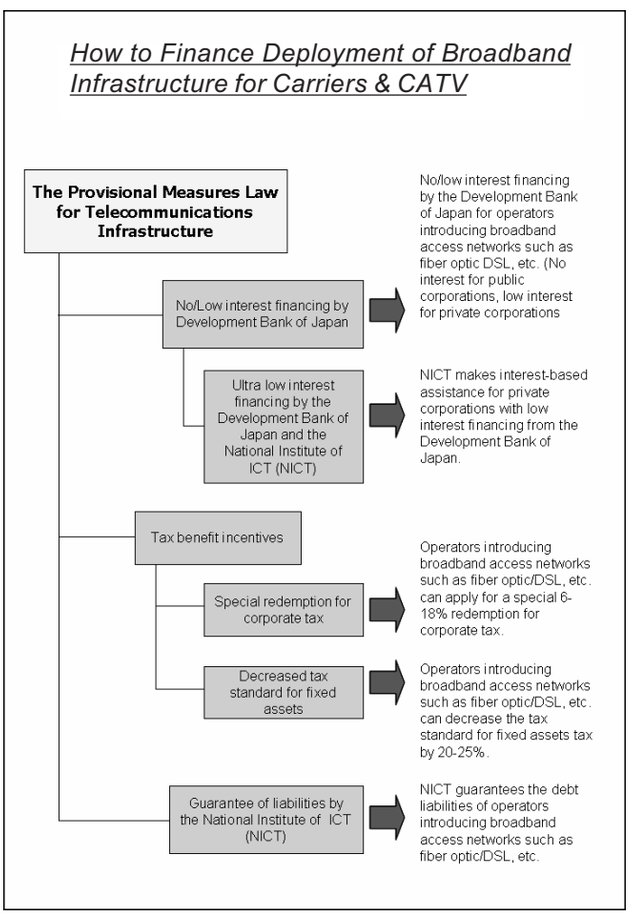
## INTRODUCTION

Japan is set to move forward to developing a broadband and ubiquitous network society as envisioned under the concept of an advanced information society. And the successful implementation of e-government in Japan will serve as the foundation to achieving this goal. How does e-government affect the government itself, the business sector and the citizens? According to a 2005 user survey by the Institute of E-Government, the two main benefits of e-government are improved accessibility to information and transaction, and greater accountability from the government.

To administer e-government in the country, the role of public sector and computerizations in various government agencies were taken into consideration. However, if computerization is limited to central government, this is of limited benefit to citizens. Thus, for communication between citizens and government, there is a need to go mainly through local government, not the central government directly. There is also a need to refer to e-municipality or e-local government, considering it of equal importance to e-government.

It is also important to take into account issues against some aspects of an information society, but being overly anxious about them causes obstacles to promoting e-government. These issues include information security problems, lack of unified management of agencies and the risk of socio-economic digital divide. As such, one of the problems that every country has to face in promoting e-government is the legal system, embedded in every democratic government. Computerization and informatization of the government is, in one respect, an effective administrative and fiscal reform, but requires legal mandates. Thus, reforms in the legal system, including regulation system, are inevitably called for.

*Figure 1. How to finance deployment of broadband infrastructure for carriers and CATV. Japan encourages the private sector by providing various incentives such as no/low-interest financing by the Development Bank of Japan, tax benefits and guarantee of liability by the National Institute of ICT (NICT).*




## BACKGROUND

Needless to say, Japan is unique in its history, culture, demographic profile, state of IT development and government structural problems, though the experiences of major developed countries are worth looking into. These include the development in member nations of Asia-Pacific Economic Cooperation (APEC) and International Telecommunication Union (ITU), wherein the author has an

*Figure 2. Fiber optic infrastructure in Japan. Carriers have been receiving support from the government, such as ultra-low interest financing (1995) and tax benefit incentives. Thus, as of 2005, almost 100% of feeder points have been covered by fiber-optic cables.*

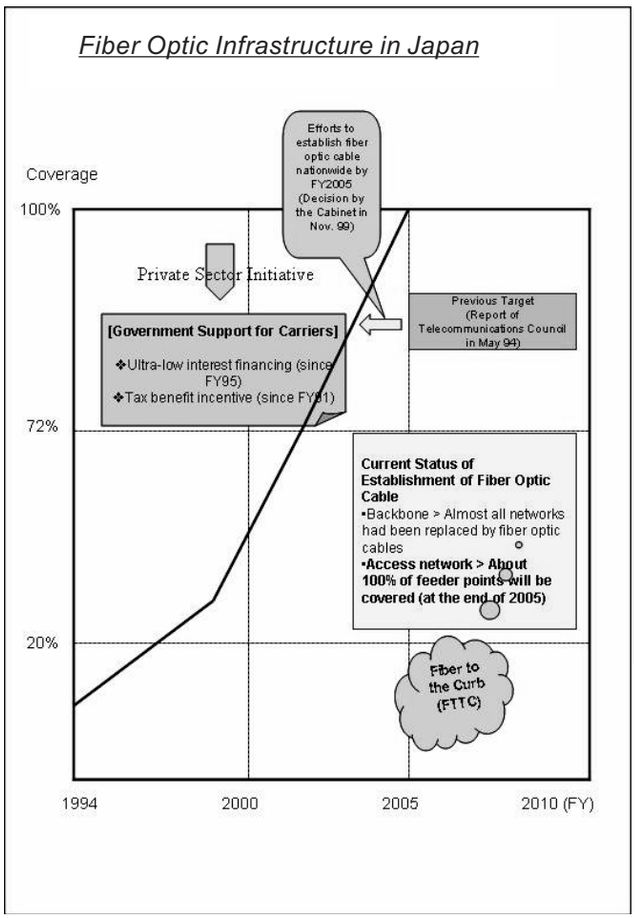
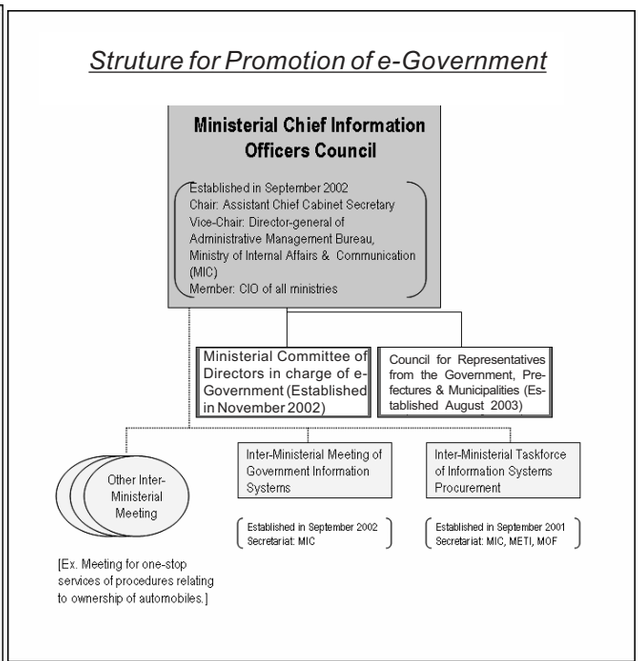



*Figure 3. Structure for promotion of e-government. The Ministerial Chief Information Officers Council, established in 2002, is the highest decision-making body. The structure was created to effectively implement the e-Japan Strategy.*




active involvement in the human resource development (HRD) sector for e-government.

To better understand the whole picture of a broadband/ubiquitous network society, it is necessary to recognize first the significance and issues of e-government, analyze the experiences and problems faced by other countries, and come up with new solutions toward the direction of e-democracy. That is, e-government is a vital key towards the success of an advanced information society.

## FORMULATION OF STRATEGIC ACTION PLAN FOR E-GOVERNMENT

The government formulated the *ICT Basic Law*, the country's basic policy framework for information technology (IT) strategies in November 2000. In compliance with this law, the *e-Japan Strategy* was announced in January 2001 to solve the digital divide, among many other issues. To effectively implement the strategy, the *IT Strategy Council* (see Figure 3) was established as the highest decision-making body. The council adopted goals to make Japan the world's most advanced IT nation within 5 years:

- to build an ultra high-speed Internet network and provide constant Internet access at the earliest date possible
- to establish rules on e-commerc
- to implement e-government
- to nurture high-quality human resources for the new era.

Under the e-Japan Strategy, priority policy areas were identified. Likewise, concrete goals were outlined, and agencies and institutions responsible for each policy initiatives were designated. These areas include:

- Establishment of ultra high-speed network infrastructure and drafting of competition policies.

- Promotion for the establishment of one of the world's most advanced Internet networks within 5 years that will enable people to have ultra high-speed access network (30-100Mbps as a standard) at affordable rates.
- Provision of high-speed, constant-access networks to at least 30 million households and ultra high-speed constant access to 10 million households. (Based on the Provisional Measures Law for Telecommunications Infrastructure)
- Nationwide installation of fiber-optic networks in FY2005. Support measures are provided, such as ultra low-interest loans, tax incentives and loan guarantees, to private telecommunications carriers.
- IT literacy education to reduce gap on digital divide.

In March 2001, the e-Japan Priority Policy Program was announced, which introduced various crosscutting issues. Under the program, the government shall promote the development of IT infrastructure to enrich public services that utilize IT in under-populated areas, remote islands and the like. This was aimed at improving people's accessibility regardless of geographic situation, thus addressing the problems of digital divide and turning it into digital opportunities. There are four issues identified, as follows:

- Promoting research and development (R&D)
  - Cooperate with the Council for Science and Technology Policy
  - Reinforce cooperation among industry, academia and government
  - Further promote R&D in areas that require public initiative· Closing digital divide
  - Addressing problems on geography, age and physical constraints to narrow the digital divide
- Dealing with new issues
  - Drawing up of solutions to emerging concerns, such as employment of highly specialized skills, particularly in IT, information security and so forth
- Harmonizing and contributing internationally
  - Compliance with international standardization of rules and specifications, dissolution of digital divide across nations.

E-government in Japan is in progress at par with other developed countries, but it has to hurdle many challenges as well. A report from the Organization for Economic Cooperation and Development (OECD), *The Hidden Threats to E-Government*, reveals that the problem is that objectives will not be achieved in developed countries due to excessive cost and time requirements. The report suggests that until an action plan for e-government has been created, its success will not be realized. Examining what convenient e-government is, this means the rising accountability of administration and the need for transparency in the political decision-making process. Among other issues, these include leadership support, funding and communication as vital keys to success. E-government portfolio performance is examined by measures of success with performance criteria as well as cost-benefit analysis.

Japan has many projects to promote e-government. These include taking into consideration the examples of advanced nations in e-government. Thus, solutions to several problems can be achieved by formulating a strategic action plan. At the same time, some concrete e-government issues are analyzed. This somehow verifies how e-government is used by the citizen, revealing aspects of high usability. Likewise, legal systems, such as the e-signature law and privacy protection law, are continuously developed and discussed to promote useful contents and deployment of broadband.

## EFFECT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INVESTMENT BY JAPANESE GOVERNMENT

The Japanese government has been seriously studying the effects of ICT investment on the national economy, as discussed in its report, *Effect of ICT Investment by Japanese Government on National Economy* (March 2003). According to the report, ICT-related activities in the government will raise the GDP economic growth by 0.5% in 2004 and 2005. Likewise, they will create new employment, at 1.31 million and 1.85 million, respectively (see Table 1). The ICT sector in Japan has also created a big impact to boost its economy.

A study made by Professor T. Hasegawa of the Ministry of Economy, Trade and Industry, *Japanese ICT*

*Table 1. Estimate (MIC)*

| | Item | Year 2004 | Year 2005 |
|---|---|---|---|
| Potential Economic Growth | Effect to Economic Growth | 0.5% | 0.5% |
| Production Trigger | Production Trigger Co efficient | 1.86 | 1.86 |
| | Amount | $ 230 billion | $ 330billion |
| New Employment | New jobs by Increase of Demand | 1.31 million | 1.85 million |

*Industry for Macro Dynamic Input-Output in JIDEA Model*, listed 10 out of the 100 industries in the model under the ICT sector. These include industries involved in the production of office machines; computers; communication equipment; integrated circuits; electronic parts; and services related to communication, broadcasting and information. ICT contribution in the GDP of Japan is 12%, which is 3%-4% higher in the United States (US).

Likewise, the study reveals that the growth rate of the ICT sector is five times higher, at 1.5%-2.68%, compared to non-ICT, which has a growth rate of 0.58% in 2003-2004.

The ICT sector continues to serve as the driving force in the national economy of Japan. Under inter-industry analysis based on macro dynamics, this sector will lead in output, employment and export for more years.

## PROMOTING E-GOVERNMENT FOR UBIQUITOUS NETWORK SOCIETY IN BROADBAND AGE

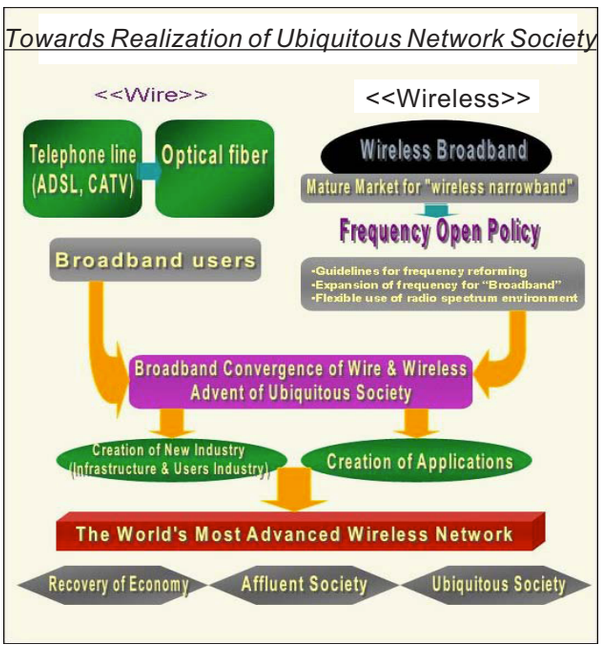
In July 2003, Japan announced the second strategy, aptly called *e-Japan Strategy II*, which echoes similar goals with the proposed ubiquitous networking society, such as:

- The shift of emphasis from the development of ICT infrastructure to the intensive promotion of ICT utilization
- The next environment of information society will be enabled by a ubiquitous network, where connection is possible anywhere, anytime, by anyone, anything (see Figure 4).

In this stage, the emphasis has shifted from the development of broadband infrastructure to the promotion of ICT utilization by end users. Structural reforms are bound to make more people, individuals and organizations actually using the online services offered by the government on the Internet. National trends and issues on ICT and socio-economic development in Japan are intertwined. Listed below are some of them:

- Promotion of e-government is essential to enhance international competitiveness.
- Application of business management models to e-government is a key for success.
- A digital society with broadband programs brings about synergy effect on regional economic development.
- Technological innovation in e-government contributes to technology-oriented community development.

*Figure 4. Towards realization of a ubiquitous network society. E-Japan Strategy II is directed towards achieving a ubiquitous society where connection is possible anywhere, anytime, by anyone and anything.*




- Information security issues are an emerging agenda in broadband.
- A chief information officer (CIO), which is a high-level HRD in ICT, is important to realize the digital opportunities.
- Strengthening competitiveness is made by increasing ICT investment in e-government.
- E-democracy could be achieved by the participation of e-people via broadband.
- Leadership is necessary to establish a national ubiquitous networking framework.

A key issue for e-government in the e-Japan Strategy is on the selection of policies that would address the extensive deployment of broadband within the short term. Studies in Japan indicate that e-government is vital to accelerate the utilization of resources in the public sector. Thus, policies on broadband for e-government are necessary to maximize the impact, particularly on the HRD in ICT. A seamless integration between public facilities and suppliers/vendors of software and hardware should contribute for the promotion of nationwide broadband networks.

A recent survey conducted by Waseda University Institute of e-Government on the status of e-government in the world shows that Japan is among the top countries. The top 10 is as follows: (1) U.S., (2) Canada, (3) Singapore, (4) Japan, (5) Korea, (6) Germany, (7) Taiwan (8) Australia, (9) United Kingdom, (10) Finland. The study also shows that the differences among the top 10 countries are actually very insignificant, and would probably decrease further in the near future.

In this survey, Japan ranks fourth, but the point difference against Canada and Singapore is very small. Japan scored very high in areas measured in the survey, such as preparedness of Internet structure, introduction of online applications and e-tax system. It got good remarks also on e-tender and e-payment systems, but need further development and patronage by the public.

Japan also scored high on optimization of existing systems and integration of network services that promote efficiency and effectiveness in the administration of public services.

Meanwhile, its Web site is in need of immediate improvement on information and documentation.

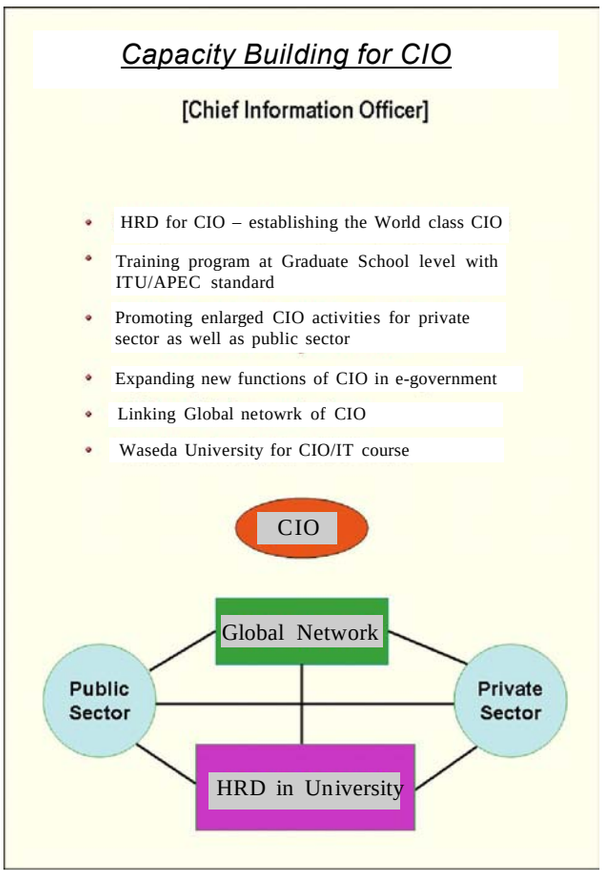
On the introduction of a CIO in its e-government, Japan scored high among the countries in the top 10. However, aside from designating CIOs in the ministry level, there is still a need to improve the quality of CIOs in its government. Further, in the promotion of e-government, Japan's efforts are marked positively, but still the problem of lukewarm support from the end users remain. Thus, the call for extensive promotion, or modification in the framework for national strategy if needed, is reiterated.

## ROLE OF CIO FOR E-GOVERNMENT

The country has been witnessing the emerging roles of CIO in both private and public sectors. As such:

- A CIO in the private sector first became popular in the early 1990s. Since then, it has been essential for companies to create an ICT strategy on cost, security and management system. However, there is a lack of understanding on the role and responsibilities of the CIO (see Figure 5).
- For the public sector, the government established the Ministerial CIO Council for coordination of inter-agency activities.
- Methodology for HRD and support systems in the private sector has led to the establishment of professional graduate schools on CIOs and the redefinition of its role and function.
- A CIO plays an important role for both public and private sectors as: top decision-maker; IT strategist; IT budget planner; specialist on risk management; promoter of business innovation; engineer on e-procurement; and key communicator. Given the many responsibilities of a CIO, it has become a very popular HRD for e-government.

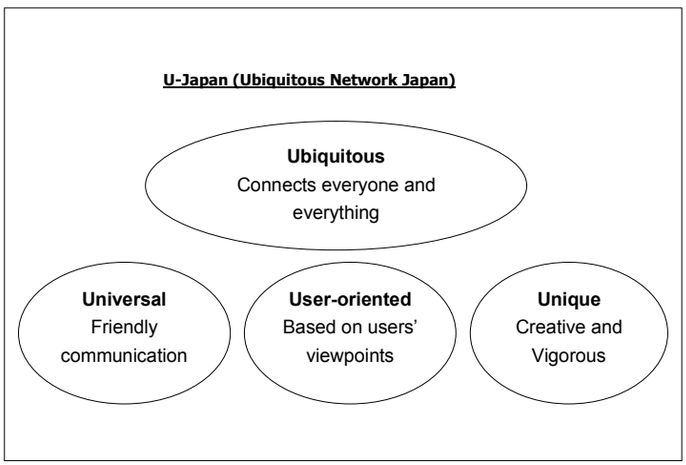
*Figure 5. Capacity building for a CIO. In response to clamor from both the private and public sectors to provide a formal education for CIOs, Waseda University has been the first school in Japan to offer a CIO/IT degree course.*




## FUTURE TRENDS

A ubiquitous Japan is envisioned as the next generation ICT society by 2010. Currently, many countries are embarking on efforts to realize a ubiquitous network society that will make possible easy connection "anytime, anywhere, by anything and anyone." In this society, people will be able to easily share knowledge and information,

*Figure 6. U-Japan. The Ubiquitous Network Japan goes beyond the deployment of broadband network that will allow connection by everyone and everything, but ensures that services online are universal, user-oriented,and unique to every needs of its citizens.*




create new values and realize a more convenient and comfortable life by changing a wide range of information.

The u-Japan Policy drafted in 2005 anticipated issues that will arise in 2010. Based on a questionnaire that determined the needs of consumers, the most important concerns are the safety and security of society. Three policy packages are created under the u-Japan to address these issues.

First is the fulfillment of a sophisticated network. Strategies include: to lay out a ubiquitous accessible environment; open radio waves; promote digital broadcasting; integrate promotion of local information; construct a new IP structure; lay nationwide broadband in equal proportions; promote a steady competitive policy; and support the Asian Broadband Program.

The second is to activate the ICT industry by acquiring opportunities for new growth and providing measure for a rapidly changing business environment. Strategies include: to promote e-business collaboration, networks with smart household appliances, and distribution and usage of content; and to revolutionize industrial organization, enhance cooperation between the public and private sectors, and nurture ICT human resources.

The third policy package will address criticisms against a ubiquitous society. To resolve these, all issues on a ubiquitous society are organized in 10 segments. Afterwards, 100 specific issues will be identified and studied to determine whether they are being tackled under current measures. These issues are prioritized and clarified to the public. Likewise, to prepare the society to better understand the concept of a ubiquitous society, basic rules are organized. At the World Summit on Information Society (WSIS) in Tunis in November 2005, the Ubiquitous Network Society was seriously discussed, as well as Internet governance and digital divide issues.

The realization of a ubiquitous network is expected to create new industries, business and markets; realize a safe and highly convenient society; and promote upgrading and efficiency in various areas, such as education, ecology and employment. The economy of Japan is expected to increase threefold, at 87.6 trillion yen in a ubiquitous-related market scale in 2010, based on the current state and prediction of the size of market created in a ubiquitous network society. Ubiquitous service solutions will expand new possibilities in the fields of business and public services.

A ubiquitous network society is consistent with the key principles of the Geneva Declaration of Principles. That is, to provide, "universal, ubiquitous, equitable and affordable" access to ICTs and to ensure that everyone can benefit from the opportunities that ICTs can offer.

## CONCLUSION

Japan has been consistent in formulating national ICT plans that allow the realization of e-government. These included the Basic ICT Strategy in 2000; e-Japan Strategy and e-Japan Priority Policy Program in 2001; and e-Japan Program in 2002, all of which addressed top priority issues, such as:

- Ensuring security and reliability of advanced information and telecom networks
- Digitalization of administration and application of IT in public sector areas
- Facilitation of e-commerce
- Promotion of education and development of human resources
- Formation of the world's most advanced information and telecom networks

The second stage, e-Japan Strategy II, which took off in 2003, faces another challenge for e-government. That is, to usher Japan in the era of a ubiquitous society by facilitating the deployment of broadband network nationwide as a backbone network by fiber optics. Core technologies that support a ubiquitous society will be developed for different layers, such as applications, networks, platforms and devices, and will expand promising industries.

The greatest challenge for e-government in Japan has been the response of the end-users. The government is firm to make every Japanese take advantage of services online. Thus, the second strategy is focused on addressing this problem by reviewing the content and application design of many government portals, especially various online services to both businesses and citizens, and to intensively promote the e-government scheme. In conclusion, Japan has already taken up the challenge of creating a ubiquitous network society by launching the U-Japan Strategy, and is prepared to overcome various issues, including technological innovation, applications and security.

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## KEY TERMS

**APEC TEL:** Asia-Pacific Economic Cooperation Telecommunications.

**Broadband:** Refers to data transmission where multiple pieces of data are sent simultaneously to increase the effective rate of transmission. In network engineering, this term is used for methods where two or more signals share a medium.

**CIO:** Chief information officer.

**CIO Council:** CIO Council is the principal interagency forum to assist CIOs in realizing their mandates to ensure the rapid and effective implementation of information management and information technology (IM/IT) solutions.

**e-Japan Strategy:** Proposes that Japan take revolutionary yet realistic actions to create a "knowledge-emer-

gent society" in which all citizens can actively tap information technology and fully enjoy its benefits.

**Fiber to the Home (FTTH):** FTTH Asia-Pacific is a market development organization whose mission is to educate, promote and accelerate FTTH and resulting economic and quality-of-life enhancements.

**i-Mode:** i-mode makes your mobile phone a useful tool of everyday life. Send e-mail, surf the Internet, check the latest news, play games, shop, book airplane tickets and so much more—all with your i-mode mobile phone. With an i-mode phone display, you can get information from i-mode menu sites (programs) and Internet sites that are i-mode compatible, and can exchange i-mode mail. Simple operation, inexpensive charges and available all over Japan.

**MIC:** Ministry of Internal Affairs and Communication.

**Radio Frequency IDentification (RFID) IC Tag:** An automatic identification method relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is a small object that can be attached to or incorporated into a product, animal or person. RFID tags contain antennas to enable them to receive and respond to radio-frequency queries from an RFID transceiver. Passive tags require no internal power source, whereas active tags require a power source.

**Ubiquitous Society:** An ideal society where connection and communication is possible at anytime (24 hours a day/7 days a week) and anywhere (regardless of geographic situation), by anyone (including the very young and old, disabled, illiterate) and anything (machine to people, and machine to machine).

# Transformation of Government Roles Toward a Digital State

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## INTRODUCTION

Information technologies (IT) and the new (virtual) space of dominion that they create can alter the order of the powers of the democratic states.

This article will discuss the idea that the digital state is becoming a *Virtual* state with less power of control over its territory, because the historic power of the state is being restricted by the rise of governance beyond the state. The process of globalization, as well as the larger use of digital technologies, challenges the Westphalian nation-state, changing the state's boundaries so that new forces and new actors acquire even larger space of dominion.

We will explain that the information society challenges, but does not eliminate, the effectiveness of the state. The Web, with its open spaces, extends the state's boundaries, creating new spaces of virtual dominion and changing governments structures: Actually, digital technologies affect functions of direction, control and organization of governments, and democracy quality, opening new areas of dominion for governments.

Even if some of the functions of the states, like those related to economics, are diffuse under the new globalized and virtalized world, the states still preserve most of their political and military power. And more, the regulatory role of the state is considered pivotal: In the future, national governments need to define a new code of regulation of the Internet to defend citizens' rights in the virtual space.

## BACKGROUND

The Internet creates a new space for "virtual" power, where it is not completely possible to individualize classical concepts of state and nation, rights and laws. Some scholars think the power of the state can be compromised from the pre-eminence of information and communication technologies (ICTs) (Dyson, 1998; Tapscott, 1998), imagining catastrophic scenarios and losses of power of the states: They are considered incapable to keep up with information society's innovation. In the same way, Jerry Everard, in *Virtual State, The Internet and the Boundaries of the Nation-State* (2000), examines the impact of the global growth of the Internet and links it to the fragmentation of the unitary state intervenes. Everard emphasizes that the traditional realistic approach was geared towards the identification of the state as an individual actor, embracing the Cartesian idea of sovereign identity. In relation to this analysis, Nicolas Negroponte sees in the growth of the Internet, the end of the nation state. In *Being Digital,* he argues that the four cardinal virtues of the information society—decentralize, globalize, harmonize and authorize to do—are going to subdue the Hobbes' idea of the state as a Leviathan (Negroponte, 1995). The state was seen by Hobbes as the social personification of the *corpus* of the domestic polity. By analogy, the Prince was considered by Machiavelli like the captain of the ship of the state (Machiavelli, 1975). By extension, the social organs working were the arms or limbs of the state. Establishing such boundaries, rules and laws of the state defines the identity of a nation. Indeed, the identity is the result of the process of the construction of boundaries, a manner to identify oneself from others. But, today, the ability of the Internet to break through boundaries challenges the traditional structures based on the identity of the state. This new situation changes the nature of the state's boundaries, but does not erode them. In the new digital state, the point is to rethink the manner of the construction of national identity and the meaning of identity itself, which is no longer connected to territory.

## THE STATE SOVEREIGNITY IN THE WEB

As Mattelart reminds us, "like it or not, the territory of the nation-state remains the place where the social contract is defined. It has by no means reached the degree of obsolescence suggested by the crusade in favor of deterritorialization through networks" (Mattelart, 2002, p. 609). The territory of the nation state is still the historical and functional painting of the democracy, the place of definition of the social contract. Therefore, it is quite distant from the obsolescence that the crusaders of the

Web attribute him (Mattelart, 2002). Hence, the information society challenges—but does not eliminate—the effectiveness of the state, whether in the political domain rather than in the economical arena, which before was sovereign.

The nation states that between the 12th and the 19th centuries became sovereign in the economical field (making the boundaries of the economy the same boundaries of the state) have seen to change their powers. If, before, the economy had to take the state into account, now it is the state that has to take the economy in consideration. Even if the state is continuing to develop an important role, it has lost its economical sovereignty, because the boundaries of the state and of the economy do not correspond anymore (Cassese, 2002).

If one side the Web, with its open spaces, extends the state's boundaries, creating new spaces of virtual dominion; from the other side, the process of globalization and the larger international contest moves the economical activities out of the state's territory, and this ends with the exasperation of those states familiar with their boundaries and spheres of influence. Consequently, there is an imbalance between economy and state that the governments have tried to resolve in different manners the last few years. In Europe, this has occurred through cooperation between the authority of different nations, arranged from national laws or bilateral agreement, through the transfer of government tasks to trans-national organisms (constituted on multilaterals agreement) or through supra-national organisms that absorb state functions. The extension of the government's tasks and spaces created regulation on different levels. A different model replaces the Westphalia one, according to which states are the unique subjects of international law and the principles of their sovereignty and legal equality are absolute. The state redefines its own organization and renounces the actual functions in favor of smaller regions (the so-called "inside federalism") and greater regions (the so-called "outside federalism"). For that, "it is lost also the unitary political connection of the citizen with the state, in favor of a balkanization of the belonging and of the identity" (Cassese, 2002, p. 50). Also, technology has played a crucial role opening the financial world markets—liberalization and technological change are strictly interwoven—and some national monopolies, like telecommunications and electricity, were transformed in areas submitted to national and international competition.

Therefore, the proposition—supported by the Californian ideology—that the physical space in which the states live has been marginalized or lost its importance needs to be reconsidered. The withdrawal of the state relates to some areas (especially public management and welfare) and not the whole state, which is, instead, increasing in its dimensions.

ICTs are not depriving the states of the ability to govern and reduce their sphere of jurisdiction; instead, they are opening the jurisdictional space to competition, favoring the possibility of the expansion of the states.

In countries like the United States (U.S.) and France, for example, the increase of the jurisdiction outside their own boundaries emerges in some cases, in which some acts made outside the territory were sanctioned: As in the case of Johansen in the U.S. or the Yahoo case in France, that had effects to the inside of these states. In fact, in January 2000, the Norwegian Department of the Economical Crimes arrested Jon Johansen, who published on the Internet a program enabling Linux users to visualize DVDs, activity that broke the rules of the U.S. Millennium Copyright Act on the exchange of copies of protected systems. Although Johansen had not committed an offence under Norwegian law, he was judged to have done so according to American rules. In the same way, the French government undertook a legal action against Yahoo who allowed sold Nazi souvenir in some auctions on the Internet. Even though Yahoo was located in the U.S. and, therefore, not subject to French law, Yahoo was forced to eliminate that material from its Web site (May, 2002). These are examples of how we face up to two structures of government: the government *of the Internet* and the government *into the Internet*. With the expression "government of the Internet," we mean the technical management of it: The development of protocols, the allocation of Internet names and addresses; in short, all those procedures that guarantee the functions of coordination regulated from an independent organism, the Icann. With the expression "government into the Internet," instead, we make reference toward the political management, to the governments' strategies in order to control, organize and regulate this new space of power: The government goes into the Internet to regulate it and acquire areas of dominion and control. Therefore, on one side there is a solid structure of government of the Internet—created by the American government and presumably independent—with coordination functions; and from the other side there are the national governments, whom try to enter in the government of the Internet to satisfy of the criteria of transparency and democracy.

As Rhodes reminds us, the central government is not supreme anymore. "We live in the centreless society, in the polycentric state characterized by multiple centres. The task of government is to enable socio-political interactions; to encourage many and varied arrangements for coping with problems and to distribute services among the several actors" (Rhodes, 1996, p. 653). This is why the state is called to intervene in the new dominion of the Internet, to defend citizens' rights and values. Indeed, looking at the attempts of e-democracy made up from many governments—such as e-petitions, e-voting or e-

rulemaking—it is easy to see in these experiments a strategy (or a mere instrument) to extend the institutional framework in the digital world. The point is that the state has to find a new way to rule this new space.

If the challenge of globalization asks governments to change their centers of power, the ones of the information society is to arrange the stability of the "regulators'" governments with the flexibility of a structure that has been conceived as not regulated. The nature and the architecture of the Internet is an exception to the rules that have governed during the industrial era, and now it becomes important to think towards a specific code of regulation.

## FUTURE TRENDS

The states have to deal with the government of the Internet and, therefore, with different codes and norms from those used in the off-line world. In the new space of dominion, they find themselves facing up to the necessity to define a new code of regulation of the Internet, to establish new legislative boundaries, impose new codes and defend citizens'/users' rights and liberties.

The speed and instantaneity of the Internet means for governments a smaller control on their agendas. A centralized control is possible, but governments that aspire to monitor the informative flows across the control of Internet have to deal with high costs and big problems. The nature and architecture of the Internet makes it an exception to the rules that have governed in the industrial era, and this is why it requires a different code of regulation. In parallel, the Internet also raises economical, social and institutional questions, and governments have to stand up to them.

Lawrence Lessig is right in saying that we are moving from a world in which the laws are made by governments to one in which the architecture is created by private companies, passing from lawmakers to the "code writers" (Lessig, 1999, p. 207). Nevertheless, to regulate, to transform the informal structure of Internet in a structure of formal government is an operation that needs remarkable exercises of constitutional engineering. It means to individualize tools that limit, bind and put under control the exercise of political power. For this reason, David Post has defined the issue of control of the Internet as a "constitutional moment" (Post, 1998): a constitutional moment that should keep account of an order of global powers: in which the U.S. preserves the keys of the control of the Internet, and the European Union has to deal with it (Mayer, 2000). If Rousseau believed the freedom of individuals is guaranteed by the government of laws and not of men, then to reaffirm this freedom in the virtual space, it is necessary to think about a new scheme of "free government" guaranteed from a constitution. Information-age politics does not mean to get rid of the state, nor suggest that the terms *digital state* or *virtual state* (Fountain, 2001) are synonymous with invisible state. But rather, it means to decide in what way the states and their governments can facilitate and create the kind of society we want. Today, governments have an important role to play, especially towards the technological changes that come from the information age. Only if we understand the continuous role of the states and of their governments will the information society become (or remain) democratic (May, 2002).

## CONCLUSION

In the era of the Web and of the co-modification of information, perhaps the balance of modern society is based actually on the difficult alchemy described by Nora and Minc: the dosage between a vigorous exercise of the state's institutional powers and an always greater exuberance of civil society. IT, for good or ill, will be an important ingredient of this dosage (Nora & Minc, 1978). The information revolution certainly had a strong impact on the states but, as Robert Keohane and Joseph Nye (1998) suggest, the reason why it has not transformed the world of politics is that information does not circle in the empty space but in a political space already occupied by the regulatory state—even if not all the states are in a position to maintain such authority with success. How the state will ensure a controlled exercise of power, keeping its space of regulation within and beyond the Internet, is written in the next future.

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## KEY TERMS

**Californian Ideology:** A label for the ideological position taken by a loose alliance of writers, hackers, capitalists and artists from the West Coast of the U.S. in regards to the coming of the information age.

**Constitution:** The constitution is a "form" that regulates the organization of the state; it structures and disciplines the decision-making process. It is a procedure aimed to ensure the exercise of power. It's the social and political order of a society.

**Digital State:** In the idea of a state government that leads the nation in adopting digital technologies to improve services delivery.

**Internet Governance:** The term is used as a general reference for technical administration and coordination of Internet resources. It refers to the administration and management of domain names, Internet addresses (IP numbers and autonomous numbers), the coordination of technical aspects and the definition of the technical parameters necessary for the operation of the domain name system and root servers.

**Leviathan:** In Hobbes' idea, *Leviathan* is a treatise on the origin and ends of government. Leviathan is the state, whether in the form of an absolute monarch or a democratic parliament. The state exercises its absolute power to maintain a state of peace.

**Nation State:** It is a geographic/political organization uniting people by a common government. It is a state whose inhabitants consider themselves to be a nation, geographically and legally bounded under one legitimate government.

**Westphalian Model:** It is a model based on the sovereignty of the nation-state, with a minimalist role for international law and limited international intervention to deal with disputes between nations.

# Transparency and Information Disclosure in E–Government

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## INTRODUCTION: INTERNET AND DEMOCRATIC EMPOWERMENT

The advent of new information and communication technologies (ICTs), in particular the Internet, has inspired bold scenarios about a new era of democratic governance and political empowerment that these technologies of freedom make possible. Most visions and strategic frameworks for e-government posit that this paradigm of citizen empowerment can be advanced in two ways:

1. By harnessing new ICTs in order to make the provision of government services more accountable and responsive to customers' needs.
2. By harnessing new ICTs in order to decentralize and disintermediate collective decision-making.

The first path, which could be called *e-services*, is influenced greatly by the theories of new public management, the zeitgeist flavor in thinking about public administration. New public management focuses on lean government. It conceptualizes the working of public administrations as a customer-service provider relationship, where a lean management team is tasked to put our tax money to work in order to produce those few services that the market cannot deliver. E-services, in this view, will advance democratic empowerment, because they involve the streamlining of government bureaucracies; because they can be deployed more efficiently and more flexibly and can be targeted; and because they limit the scope for abusing bureaucratic power by allowing customers to take greater control of the timing, format, and monitoring of due process in public service provision.

The second path, which could be called *e-democracy*, subsumes the various plebiscitary uses of the Internet that have been put on the map by advocates of direct democracy and now are featured in many official e-government visions and strategies. Initiatives in this area include online voting, online polls, online deliberations, and use of the Internet to contact civil servants or legislators directly (Barber, 1998; Norris, 2002). New ICTs in this context are anticipated to engage individual stakeholders more directly in decision-making processes, to enhance the effectiveness of plebiscitary instruments, and to cut out intermediaries and reconnect citizens more closely with their elected representatives.

Taken together, these two dominant themes of e-democracy and e-services constitute the main paradigm for envisioning what role the Internet can play in democratic governance and what public policies should be crafted in order to make this happen.

Governments all over the world have bought into these concepts, some enthusiastically and some more reluctantly. But all of them appear to accept these dominant expectations of how the Internet ought to transform governance. E-services and e-democracy have become the public yardstick for performance and symbolic legitimacy.

Adding to their persuasiveness is the fact that e-services and e-democracy complement each other ideally. They share a more fundamental suspicion of big government and seize upon the Internet to reassert individual freedom and self determination by making governments lean and by disintermediating deliberation and decision making. This convergence in large parts of the e-government community around a techno-libertarian value framework also is aligned closely with and, thus, reinforced by similar sentiments in the Internet developers' and early adopters' communities. With regard to Internet use in the trailblazing U.S. context, Norris (2001) finds that "users proved significantly more right-wing than non-users concerning the role of the welfare state and government regulation of business and the economy". This wariness with regard to regulatory intervention is not confined to the Internet but reflects a long-standing suspicion against politicizing technologies (MacKenzie & Wajcman, 1999).

## A NEGLECTED DIMENSION: E-TRANSPARENCY

As laudable as these goals are, it is questionable whether this almost romantic vision of disintermediation and self-representation that has been fueled by the arrival of the Internet adequately captures the complexities of political claim-making and governance in a modern democratic

society and whether it presents the full range of options for the Internet to be used in this context.

It can be argued plausibly that these conceptions of empowerment and the e-government strategies that they inspire pay too little attention to the wide field of conventional practices of political engagement A number of commentators have drawn attention to the democratic shortcomings of the e-services agenda (Chadwick & May, 2003; La Porte et al., 2000). The e-democracy theme does not fully make up for these shortcomings, either. The citizen is not only customer or voter, but he or she is also a citizen who participates in public affairs predominantly via a thick, rich layer of social networks and collective entities that help to transmit preferences into political claims, that bundle interests and mobilize, that monitor government conduct, and that condense dissatisfaction into opposition.

Refined conceptual work and emerging empirical evidence on the political effect of the Internet suggest that hopes for radical dissemination and individualistic empowerment are premature. It is more likely that a messy patchwork of organizations and affiliations, and of civil society and media intermediaries will remain the predominant infrastructure for forming political claims and disciplining public power. Analyses of conceptual and comparative empirical evidence on the relationship between the Internet and the political process corroborate this claim (Agre, 2002; Bimber, 1998).

The failure to recognize more firmly the persistence of these forms of political engagement and the widespread occupation with more visionary e-services and e-democracy initiatives is deplorable. It seems to have pushed into the background a set of rather fundamental policies and initiatives that would help to make the Internet work better for democracy. This neglected area of engagement is the use of the Internet for making governance structures more transparent. This agenda, which could be called e-transparency, focuses on comprehensive information disclosure by all branches of government. It prioritizes progressive statutory freedom of information rights to make disclosure enforceable, and it places the objective to make information disclosure more effective in enabling critical scrutiny and constructive engagement in public decision making at the center of thinking about the Internet for political empowerment and practical e-government strategies.

A commitment to e-transparency is based on the recognition that what lubricates the machinery of political and civic engagement is the flow of information from and to systems of governance. Transparency is a key to good governance, political empowerment, and a functioning democratic system. The importance of transparency long has been recognized by political scientists. Dahl (1971) made an early claim in this respect from the perspective of prescriptive democracy theory. More recently, March and Olsen (1994) developed an institutional justification, while Linz and Stepan (1996) highlighted the benefits of transparency for processes of democratic consolidation. Florini (1997) and Mitchell (1998) elaborated on the respective advantages for international regimes.

## THE PRACTICE OF E-TRANSPARENCY

While all governments pay lip service to good governance and transparency, e-government strategies rarely are attuned to these commitments. In most countries' e-transparency, little attention is being given to creating an enabling legal and policy environment for e-transparency (Zinnbauer, 2004). Some countries, such as Germany, that pursue ambitious e-government initiatives have not even put in place a basic freedom of information law that would be a prerequisite for advancing e-transparency. Freedom of information laws, where they have been passed, typically sideline technology-related issues. A 2004 survey of freedom of information laws around the world found that about 80 countries have instituted or are in the process of establishing freedom of information laws, but very few explicitly consider the role of electronic information and the Internet. Just a handful of countries has clarified that freedom of information practices apply to electronic records, and even fewer have established a statutory duty to publish more expansive information online or to accept e-mail requests for documents (Banisar, 2004). This neglect is mirrored in the information disclosure policies of international regimes and multilateral development banks. Information guidelines for these institutions, if they make reference to the Internet at all, contain only vague references to electronic dissemination but do not set any explicit and, thus, enforceable standards for what should be published online, when it should be published, and in what form it should be published. This is what the author found when reviewing disclosure policies of the World Bank, IMF, UN-ECOSOC, UNDP, AFDB, ADB, and WTO in May 2004. Mendel (2003) arrived at similar results. To give another example, disclosure policies for the European Union Commission and Council only call for the establishment of an electronic register of documents that have been produced but do not mandate full-text online access (Curtin, 2003).

This neglect of e-transparency in the legislative framework also is replicated in the practice of e-transparency in many countries. A global survey of e-government in 192 countries found that on average, government Web sites achieve less than half of the maximum score for their transparency function (La Porte et al., 2001). Similarly, a

closer look at parliament Web sites around the world reveals that only 14% post the full record of parliamentary proceedings, and only 5% provide the opportunity to subscribe to mailing lists for receiving regular e-mail updates (Norris, 2000).

These shortcomings are replicated at the level of local e-government. A 2004 survey of 212 local and regional government Web sites in France disclosed that only half of the sites provided minutes or proceedings of council meetings online (Artesi, 2004).

Even the development around the arguably most ambitious initiative to integrate the Internet into freedom of information rights, the 1996 U.S. Electronic Freedom of Information Act (EFOIA), does not really give much reason for optimism. A 1998 assessment of 57 U.S. government agency Web sites by OMB Watch, a public interest group, found that compliance was very unsatisfactory. None of the examined agencies was in full compliance with EFOIA, and 25% had not even attempted to implement these compulsory provisions (Henderson & McDermott, 1998). These findings were confirmed by a follow-up study in 2000, which detected a lackluster performance of agencies and criticized that many questions about the scope of data that would fall under the act and about adequate dissemination standards remained unresolved (Halstuk, 2000). Practices in 2003 were still far from optimal, as an audit of freedom of information practices conducted by the National Security Archive, an initiative based at George Washington University, revealed. Less than half of the 35 agencies that were contacted responded to a freedom of information request in time, while three lost the request, and, overall, neither the availability of e-mail contact information nor the inclusion of electronic information in disclosure practices could be rated as satisfactory.

## TOWARD A PROGRESSIVE AGENDA FOR E-TRANSPARENCY

All efforts to devise a policy framework for Internet-enabled information disclosure should start with the recognition that transparency rules and technology use are interrelated. Technology-neutral rules in principle are desirable but tend to be too vague in practice in order to be effective. More desirable are rules and strategies that set transparency and disclosure standards with direct reference to the new information dissemination capabilities that the Internet affords. Technology-related elements for such a policy framework and e-government strategies could be grouped into the three following interrelated clusters:

1. Internet for making requests for information easier
   - Establish rights for any interested party to file information disclosure requests electronically and receive requested information in electronic format for easy perusal.
   - Publish a detailed online guide on how to make information requests.
   - Provide public access computer terminals for filing electronic requests and researching transparency information online.
   - Establish an online register of all documents produced, including the ones that are not released in full text publicly, in order to curb excessive secrecy.
   - Provide electronic information push tools that allow one to sign up for and to receive e-mail updates of new materials made available.
   - Adopt electronic data standards such as XML that allow users to process and reuse information in a flexible manner.
2. Internet for widening and deepening transparency
   - Ensure that electronic information and communications are covered by disclosure rules.
   - Set acceptable response times, update cycles, charge users with reference to the speed and efficiency afforded by electronic information management.
   - Use advanced electronic publishing technologies that help to protect privacy by allowing one to tag personal information that automatically is omitted in the online publication process.
   - Significantly expand the scope of accountability information that is required to be published proactively and mandate publication online.
   - Enable keyword searches and other advanced online search tools for accountability information published online.
3. Internet for a new quality of contextualized and discursive transparency
   - Use the power of hyperlinking in order to integrate traditional accountability information with other categories of published information such as environmental indicators for air and water quality.
   - Subject rule and policymaking processes to particularly stringent disclosure standards with mandatory advance notice and comment periods and the online publication of all draft materials before the final decision to allow for meaningful input.

- Post received comments online alongside draft documents in order to facilitate constructive deliberation.

Aspects of this policy agenda are beginning to be incorporated in innovative pilot projects around the world, albeit in fragmented manners. Some practical examples include the following:

- **Canada:** Compulsory online disclosure of hospitality and travel expenditures by ministers and senior government officials.
- **London:** Online access to air pollution data, searchable by postal code and directly linked to environmental targets and commitments set by the government.
- **Mexico:** Freedom of information law requires the establishment of public computer terminals for access to electronic information.

As these examples and the suggested policy agenda indicate, the Internet can leverage information disclosure in a variety of ways. Maximizing these benefits requires according efforts for information disclosure in a central place in e-government strategizing and practice and, at the same time, updating related disclosure rules and entitlements with direct reference to the new opportunities afforded by the Internet.

## FUTURE TRENDS: MIXED PROSPECTS FOR E-TRANSPARENCY

Devising and putting into practice such a strategy for e-transparency is by no means easy. A number of obstacles can be discerned. First, under the current terms of the governance debate, even the status quo in freedom of information practices has come under attack. A focus on lean government in combination with severe pressures on public budgets has drained funding for existing freedom of information operations. A study on the public administration in Canada, for example, found that spending for freedom of information practices typically is considered non-essential and, accordingly, has been cut, which has driven up response times significantly (Roberts, 2000). Similarly, a review of agency compliance with the electronic freedom of information act conducted by the U.S. Government Accounting Office (GAO) came to the conclusion that "information dissemination is still not an integral part of agency information resources management programs," thus giving rise to the assessment that information dissemination is an "unfounded mandate" (Government Accounting Office, 2003).

Budget cuts, insufficient funding, and a narrow interpretation of information disclosure go hand in hand with an increasing drive toward the comodification of information produced by the public sector. In the U.S., for example, administrative guidelines restrict the information services that public authorities can offer to the public on the grounds of often-unspecified concerns over unfair competition. Salem (2003) and Jensen (2003), for example, describe a prominent case in which illusive concerns about unfair competition helped to shut down access to scientific information provided by a public authority despite proven utility and cost savings. Most paradoxically, some public policies that have been passed in direct response to the digital revolution actively support this precarious development. One motivating factor behind the European Union *sui-generis* protection for databases, for example, was to enhance the commercial value of information held by the government (David, 2000). It appears not too far-fetched to speculate that this opportunity for making government information more marketable is likely to evolve into a standard activity for revenue generation for public administrations. In such a context, freedom of information only can be regarded as an annoying burden.

## CONCLUSION

E-transparency is not a very visionary project when compared to the lure of direct democracy or user-controlled online service provision as the dominant themes in e-government scenarios. The relation between novel ICTs and freedom of information often is viewed as too commonsensical to necessitate a proper normative grounding, too straightforward to require an in-depth conceptual or practical elaboration, and too banal to qualify for a prominent place in visionary conceptions of governance in the information age. This is unfortunate and misguided. It squanders a significant opportunity to make the Internet work better for democratic empowerment in authoritarian settings, advanced democracies, and international governance regimes alike. Refocusing e-government visions and strategies on the basics of freedom of information and transparency is a timely and important task, and more research on best practices, challenges, and shortcomings can make an important contribution to this end.

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## KEY TERMS

**Accountability Information:** Information provided by and about institutions of collective governance for the purpose of satisfying the obligation to be answerable to the public and to submit to democratic oversight

**Comodification of Information:** The increasing practice of emphasizing the economic value of information and perceiving and treating information as an economic good that can be produced, traded, and conceptualized in legal terms just like a conventional physical commodity.

**Deliberation:** Approach for facilitating collective decision making through informed exchange of viewpoints and joint assessments of facts, reasons, and their respective importance by all affected stakeholders.

**Electronic Data Standard:** Collectively agreed upon technical specifications for how to digitally encode, process, transfer, and display a certain class of data.

**E-Transparency:** The use of Internet-related tools for making governance systems more transparent.

**Freedom of Information:** Normative presumption, often encoded as legal entitlements (freedom of information legislation), that all information produced and used by institutions of collective governance ought to be available to the public for purposes of accountability and democratic oversight.

**Sui-Generis Database Protection:** The recognition of an intellectual property right for collections of data rather than via the conventional intellectual property category of copyright, which additionally requires an element of creativity or innovation in order to constitute an intellectual property right for a specific information collection.

# Trust in Digital Government

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## INTRODUCTION

The concept of trust in organizations has been an important area of recent research in sociology and management science (Sztompka, 1999). Trust is positive expectations of positive actions by others, and is important to well-functioning organizations of all sorts. Trust facilitates the effectiveness of government. A focus on trust leads to a more humanistic view of individuals within organizations than that of the traditional managerial psychology of humans solely as input-output devices whose performance must be monitored and measured.

New technology changes the form of government operations. So it is natural to ask how trust is affected by the advent of the technologies and practices of digital government, as it is affected by online security practices (Friedman, Kahn, & Howe, 2000). On the one hand, digital government should be more efficient government, and people trust more in well-run, efficient processes. On the other hand, digital government could enable governments to evade responsibility for their actions by imposing new barriers to citizens, restricting access to information more, falsifying information more easily, and providing a new set of excuses for inefficiency. Some extremists (Postman, 1993) claim that most technology cannot be trusted, but few people agree. So the issue needs to be examined at length.

## BACKGROUND

Sztompka (1999) provides a detailed analysis of trust relationships. He defines trust as "a bet on the future contingent actions of others" and enumerates six major factors supporting it: (1) reputation, (2) performance, (3) appearance, (4) accountability, (5) precommitment, and (6) contextual facilitation. Of these factors, reputation is not much influenced by whether government is digital or not. Performance and accountability are supported by virtually any digital government as well as government: Past performance of government (demonstrating that procedures are being followed) and lines of accountability (indicating that recourse is available for fixing problems) are almost always present. But digital government can improve performance and accountability by exploiting its ability to store extensive documentation. For instance, digital government can keep records (while removing identifying information to maintain privacy) to demonstrate that citizens are being treated fairly and equally. They can also track citizen interactions and requests to show that procedures are functioning properly.

Appearance is related to the user friendliness of digital government, and this can be ensured by good human interface design for the software, with phone numbers and email addresses of human contacts provided in case of problems. Precommitment (fulfilling initial steps to build trust in completing a full promise) can be accomplished in digital government by offering receipts, certificates, and other documentation at milestones while providing a service. Finally, contextual facilitation is the "culture of trust" cultivated by a government by treatment of its citizens, and is only indirectly related to digital government through its performance.

Sztompka also distinguishes between instrumental trust (related to specific goals), axiological (based on moral expectations), and fiduciary (based on legal or quasi-legal obligations). Government is generally a means to the ends of its citizens, rarely makes moral claims, but does fulfill legal obligations. Thus it concerns instrumental and fiduciary trust, the latter in regard to laws and the former in regard to everything else. (Hardin, 2002) points out other important differences between trust in government and trust in people, and suggests that government cannot actively seek the trust of its citizens but can only gain trust by acting consistently in a trustworthy manner. Levi and Stocker (2000) point out other important kinds of trust involved in citizen-government relations.

## ACCESSIBILITY OF DIGITAL GOVERNMENT

Now let us consider some specifics of trust in digital government. Digital government usually strives to increase accessibility of the government to the citizens, and this will increase trust in the government by Sztompka's factors of appearance and performance. Digital government provides good ways for government to get public feedback with surveys, complaint forms, and online discus-

sion groups. But this requires some effort by the government; a digital government designed only for efficiency may function as a "screen" keeping government officials more distant from the people, thereby decreasing trust.

Even when digital government is accessible, not all citizens may have equal access to it. A social and cultural gulf separates the computer literate and the computer illiterate because of the necessary investment in technology (Cronin, 1995). The computer illiterate are feeling increasingly disenfranchised, and this exacerbates their mistrust of a government that uses digital government technology. So it is essential that government provide technological support for access to digital government by all citizens. This could take the form of free public access devices at dispersed locations, or subsidies for the purchase of devices and software necessary to use digital government. It should also include free training in their use, because not all technology can be designed to be usable without training. Without such steps to make digital government accessible to most of a society, distrust of government will increase regardless of its efficiency.

## SECRECY IN DIGITAL GOVERNMENT

All governments keep secrets to protect themselves from exploitation by other governments and to preserve the privacy of their citizens (Yu, Kundur, & Lin, 2001). Information technology can help protect secrets. For instance, messages encrypted with today's strong encryption methods cannot be deciphered without the key no matter what incentives are offered. Other technological developments like cryptographic protocols, security kernels of operating systems, and firewalls are also helping secrecy and protecting privacy, and generally promoting trust in government.

But governments that want to keep unnecessary secrets will also find this technology helpful, and this can hurt trust in regard to Sztompka's issues of appearance and accountability. This is a political issue, however, and citizens may have different ideas than their government does about what should be kept secret (Theoharis, 1998). Governments need to legitimize themselves, and secrecy erodes legitimacy. If taxpayers cannot see what their taxes are being spent on, or militaries fail to protect a country despite their secrecy, dissatisfaction grows. Economic downturns or unpopular wars may then cause serious political stresses, and can even destroy a government, as happened in Argentina in the 1980s. The number of secrets kept by the United States government continues to increase without much justification, damaging citizen trust.

Secrecy includes prevention of correlating disparate pieces of non-secret information to infer secrets. For instance, knowledge of the average salary of female employees in a department can be combined with knowledge there is only one female employee in the department to infer her salary. However, these problems are well known by statistical agencies, and automatic checks can be made before releasing correlatable information (Adam & Worthmann, 1989).

## DELIBERATE DECEPTION IN DIGITAL GOVERNMENT

Politicians lie and equivocate on many occasions since protecting secrets and pleasing large numbers of people often requires it (Eckman, 2001; Nyberg, 1993). This accounts for some of the low trust that citizens have in governments. Thus it is important for digital government to maintain high standards of truth telling to avoid being associated with the poor reputation of politicians (and losing trust on Sztompka's factors of reputation and performance). One important principle is that digital government should mostly record and report matters of fact. Exceptions must be made for discussions and public comments on matters of policy, but even these can be made more trustworthy by ideas such as linking statements in a discussion to the raw data supporting them. World Wide Web technology makes it easier to provide such links.

A reason to be very cautious about deception by governments is that trust is subject to different laws than distrust. Josang (2001) argues that trust can decrease quickly with experience but distrust decreases much more slowly, and this has been confirmed in experiments (Rowe, 2004). This is because actions that create distrust tend to be hard to interpret as accidental. Thus a few incidents of deception (or even half deceptions) can ruin the trustworthiness that a government has taken years to build. But easy online access to validated information should reduce the ability and desire of governments to lie about matters of fact, reducing the total amount of lying that they do. And if a government that tries to limit access to important information, or lies about possessing it, it can be seen as almost as bad as if it lied about it in the first place, as citizens become familiar with the capabilities of digital government.

Another issue is that third parties besides a government and its citizens could use digital government technology for their own deceptions. For instance, vendors could insert advertising in the software they supply to a government, or trespassers could post false information on government Web pages. Such events would lower

public trust in the government. So digital government must enforce software standards and implement good information security practices.

## AUDITING

Every legitimate government must also provide safeguards to prevent secrecy from being exploited for personal or political advantage. For instance, secrecy should not be permitted to enable embezzlement, awards of contracts to relatives of government employees, or a campaign of harassment against political enemies. Audits are one way to prevent this (Mercuri, 2003). These are independent analyses of the secret data by accountants, regulators, lawyers, and other purportedly independent evaluators to confirm that policy and laws are being obeyed. Computer software is essential to auditing as it can systematically check all the details. Software can also check for bugs and loopholes, either inadvertent or deliberate, that could permit policy violations or crime (Prins, 2002). With automatic auditing, digital government can in fact be made more trustworthy than traditional government.

Auditing requires recording all changes and attestations for a key document such as a budget with indications of who made them and when; computers can easily record such information. Then if there are discrepancies, blame can be localized, and this supports Sztompka's trust factor of accountability. Such controls necessarily increase bureaucracy in government, but bureaucracy is a price that must be paid for a trustworthy government (Wilson, 2000). Bureaucracy has an additional benefit in increasing the reciprocal trust that government employees have in citizens, since it limits citizen interactions to a narrower set of activities and this can reduce the stress on government employees.

Mandated disclosure is often coupled to auditing; it can reduce the amount of secrecy used by a government and improve its legitimacy through accountability for decisions. For instance, departments can be required to disclose how they spent their budgets. Mandated disclosure can occur after a time limit. For instance, classified information in the United States must be disclosed after a period of time when it cannot compromise ongoing activities. While intelligence agencies may grumble about it, it is usually beneficial for trust in government to reveal 50-year-old information.

## AUTHENTICATION

Authentication is an accountability technique related to auditing, and includes methods for verifying the integrity of information and the identity of people (Smith, 2001). Authentication can confirm that digital documents are unmodified, which is important since it is so easy to change them. Authentication can also prove that software (including auditing software) has not been tampered with, confirming that no viruses, worms, or other "Trojan horses" have been inserted. Authentication of digital data uses methods of cryptography and "digital signatures"; public key cryptography is particularly useful because it can be used either to encrypt or to authenticate. Effective authentication methods prevent signatures from being copied from one document to another by making the signature a complicated function of the contents and date of the document.

Authentication can thus prove the author of a document, which prevents forgeries as well as later disavowal of authentic documents; this supports strong accountability. Authentication also can prove that a document in a sequence is missing, if one encrypts pointers to the previous and subsequent documents for each document. It can also identify sources of information leaks, by using steganography to embed unique hidden messages in each copy of a document, as in the pattern of spaces or line lengths (Wayner, 2002). Authentication and auditing are critical in providing trust in electronic voting (Kofler, Krimmer, & Prosser, 2003).

Authentication also helps preserve privacy of citizens by requiring credentials to access data. If a government site permits unauthorized people to read private personal information of citizens like credit card numbers, addresses, and birthdates, it will quickly lose the trust of its citizens. Even less obviously private data like who has visited a government site should be restricted to maintain good public trust. So access to citizen data should require secure authentication permitting access of a very small number of government employees.

But authentication on computer systems only works when one can trust the computer systems on which it is done. This requires that the operating system of the computer is free of security flaws, a challenge for the popular operating systems of Windows and Linux for which security flaws are being discovered all the time. An older and well-debugged version of an operating system can be selected, a very safe operating system with "security kernels" can be used, or the operating system can be put into hardware to prevent tampering. Increasing the trustworthiness of the supporting software can also increase trust in the operating system. For instance, good network security methods like encryption and well-tested communications protocols can prevent tampering with commands that cross the network, so their use encourages trust in the operating system.

## TRANSACTIONS AND FEEDBACK WITH GOVERNMENT

Digital government should include more than making forms and reports accessible to citizens; it should permit citizens to affect government processes (Slayton & Arthur, 2003), to address Sztompka's factors of performance and precommitment. Citizens should be able to file applications for business permits online, for instance. Permitting such online transactions can simplify citizen's lives, reducing the amount of time they spend in government offices and waiting in lines, and may be the only possible way to deliver services for widely scattered governments and those of developing countries with limited infrastructures. Providing such services increases citizen trust that government procedures are functioning appropriately. Online transactions can also eliminate much of the opportunity for bribes and other forms of corruption, and can remove some of the subjectivity of bureaucratic decision making by implementing some decisions with computer algorithms. This provides more fairness (Bovens & Stavros, 2002).

Digital government also permits feedback from citizens to the government to give citizens a better means to influence it. For instance, online surveys can assess citizen opinion, which is helpful even for nonrandom samples of citizens, or citizens can actually vote online. Proposed or existing laws and regulations can be subjected to comments on discussion boards, giving the government feedback about unanticipated problems, increasing the fairness of the laws and regulations and improving citizen trust in them.

## MEASURING TRUST IN GOVERNMENT

It is valuable for a government to measure by surveys the degree of trust can that citizens have in it. (West, 2004) reports that digital government as currently implemented in the United States is not fostering much trust. Welch and Hinnant (2003) surveyed Americans to determine what features of electronic government were most supportive of trust by citizens. They discovered that both "transparency" (accessibility of government by information systems) and "interactivity" (ability of citizens to control government in some way) were correlated with trust in government; but frequent American users of digital government were less satisfied with the interactivity available than the transparency, which tended to decrease their total trust level. This suggests that interactivity must get more attention in future systems if they are to be well trusted by citizens.

## FUTURE TRENDS

Digital government may be inevitable, but trust in digital government is another matter. Successful cultivation of trust by citizens is difficult for many governments today, and digital government is subject to many of the same stresses that make trust difficult. Clearly, good technical understanding, including human engineering of the interface, is necessary to implement digital government successfully, and a successful implementation is one precondition of trust. But another factor is the degree to which citizen needs are met by the technology, and that requires perceptive political leadership. It is too early to say how the trust issue will be resolved in digital governments.

## CONCLUSION

Digital government, like much technology, can either to improve government or make it worse. Digital government can provide advantages for the citizenry: Easier access to important information, more reliable implementation of procedures, and better accounting for actions including assignment of responsibility. If digital government is implemented well, these benefits should increase the trust of citizens in their government because they increase the appearance of trustworthiness, consistency of performance, and accountability for actions. But citizens are not very tolerant of incompetence in government, and digital government must be implemented with carefully designed and carefully tested technology to gain these benefits.

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## KEY TERMS

**Access Control:** Limitations (usually automatic) on who can see or use something.

**Auditing:** Keeping records of processes to later confirm they were performed properly.

**Authentication:** Proving that someone is who they say they are; this is particularly important with online activities where one cannot see with whom one is interacting.

**Computer Illiterate:** Lacking knowledge of how to use computers and software.

**Deception:** Causing someone to infer a false idea; lying is one subcategory.

**Digital Signature:** Digital information attached to a digital document that proves who is responsible for it by use of a code known only to them.

**Secrecy:** Prevention of access to information, enforced for digital data with encryption.

**Steganography:** Embedding hidden messages in documents.

**Transparency, Organizational:** The ease by which the operations of an organization can be understood by outsiders.

**Trust:** Confidence that future actions by others will fulfill our positive expectations, usually entailing reduced vigilance by us to monitor those actions and freed resources by us to do other things.

# Understanding Usability Issues in a Public Digital Library

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## INTRODUCTION

Designers often design for themselves unless they are trained to realise that people are diverse, and that users are unlikely to be like them. The more errors that can be avoided "up front" by the right method, the less work both test-users and designers will have to put in to refine prototypes to improve their usability. Landauer (1995) points out that it is not good enough to design interactive systems without subjecting it to some form of evaluation, because it is impossible to design an optimal user interface in the first attempt. Dix Finlay, Abowd, and Beale (1998) argue that even if one has used the best methodology and model in the design of usable interactive systems, one still needs to assess the design and test the system to ensure that it behaves as expected and meets users' requirements. Nielsen's (1993) advice with respect to interface evaluation is that designers should simply conduct some form of testing.

As digital libraries (DLs)—interactive systems with organised collections of information—become more complex, the number of facilities provided by them will increase and the difficulty of learning to use these facilities will also increase correspondingly. Like the Web, DLs also provide non-linear information spaces in which chunks of information are inter-connected via links. However, they are different in character from the Web in several important respects: a DL represents a collection for a specific purpose containing text-based and/or geospatial content and has search strategies that are clearly defined and more powerful.

After a decade of DL research and development, DLs are moving from research to practice, from prototypes to operational systems (Borgman, 2002). In the digital world, real world cues such as face-to-face interactions with human librarians and thumbing through hardcopy books have been replaced by drop-down menus, search screens, and Web page browsing. In DLs, users must map their goals onto DLs' capability without the assistance of a human librarian. As a result, wide acceptance of DLs will only be achieved if they are easy to learn and use relative to the perceived benefit (Borgman, 2000).

## BACKGROUND

In recent years, government services across the world are going online, replacing old bureaucratic service lines with accessible information and services, available 24/7, directly from the desktop, using powerful new technologies like digital signatures and electronic forms, and creating a new phenomenon called "digital government." Implemented or proposed digital government initiatives in many countries are an attempt to move more of their citizens online, thus shortening the queuing lines at traditional service counters.

According to the U.S. official state government Web site (see http://dis.wa.gov/index.htm; retrieved March 6, 2005), *digital government* offers a "one-stop shop" to many government services through the state's Internet portal. It is a fundamental shift in government culture, allowing those in public policy and government to respond much more quickly. The U.S. digital government initiatives, for example, embrace the following objectives: (1) make the process of accessing government services immediate, simple, seamless and intuitive; (2) reduce paperwork within government, and reduce costs so funds can be moved into direct delivery of services; and (3)

improve service delivery to all segments of the population, whether they are connected to the Internet or not.

In Singapore, the power of the Internet and information technology is radically altering the way the Singapore government relates to her citizens and the business community. Singapore, ranked among the world's top three e-governments by World Economic Forum in 2003, and by management and technology consultancy firm, Accenture, in 2004, aims to be "a leading e-Government to better serve the nation in the digital economy" driven by the Ministry of Finance, and executed through the Infocomm Development Authority of Singapore (IDA, 2001).

Hence, the purpose of Singapore's official digital government site, eCitizen Centre (see http://www.ecitizen.gov.sg/), is to provide easier, more convenient and more comprehensive, round the clock access to government services. Citizens can access among many library information services online via *eLibraryHub*, the National Library Board (NLB) Digital Library (see http://ele.ecitizen.gov.sg/lib/lib01.htm).

The *eLibraryHub* (see http://www.elibraryhub.com), launched on September 7, 2001, aims to provide its four million individual users access to information resources and services anytime, anywhere (Chan, 2002). It is also a one-stop integrated digital library for immediate access to vast amount of information and resources. It is both a content and community portal (Chia, 2002) and caters to users from multiple environments, from individuals, businesses, professionals, corporate to community groups (Abu Bakar, 2002).

On the content side, the library resources in the *eLibraryHub* include some 13,000 electronic magazines, journals, and online databases; 10,000 electronic books and more than 700 CD-ROM and 900 video-on-demand titles. In the "Reference Library," links to resources selected by NLB's information specialists are provided. In a bid to target the information needs of niche markets, NLB has plans to create specialized libraries within the *eLibraryHub*. Its first offering launched in end-2002 is the "China Resource Library" that provides business-related information about China. Another two specialized libraries that are being planned will cater to children and teenagers.

## SETTING THE STAGE

This article reports a study conducted on the *eLibraryHub* as part of NLB's on-going efforts to improve services of the public library, in particular, for the purpose of this article, the usability of the *eLibraryHub* in meeting users' needs via the eCitizen Centre. We also hope this study would contribute to the under-studied usability research on DLs constructed by community organizations such as public libraries and hospitals, as highlighted by Borgman (2002).

The study, conducted in early 2003, evaluated the effectiveness of the *eLibraryHub*, looking at users, uses, and usability issues of the DL. It attempted to employ a quantitative approach based on questionnaire survey to evaluate the perceived value of the DL and the effect on the intention of use by users.

## Questionnaire Development

The development of the questionnaire involved an iterative process of formulation and evaluation by five peers who were taking the Master's in Information Studies course at the Nanyang Technological University, a means of obtaining feedback from a small, convenient sample of potential respondents. The purpose was to determine the relevance of the questions and the extent to which there may be problems in obtaining responses.

The final refined questionnaire was structured such that all respondents, regardless of whether they are users of the *eLibraryHub* could answer the first part comprising demographic questions.

Users of the *eLibraryHub* were then asked in the second part about their usage of the DL. For *user satisfaction*, the users assessed the resources and services of the *eLibraryHub* as well as the overall effectiveness.

The questions asked were:

- How satisfied are you of the resources used?
- How satisfied are you of the services used?
- Overall, how would you assess the effectiveness of *eLibraryHub?*

They were asked to rate their satisfaction of the resources and services on a Likert scale from "1" (most satisfied) to "5" (least satisfied) in terms of four factors: availability, accessibility, quality, and effort. The factors were based on the second major class (Class B: "Interaction") of the taxonomy derived by Saracevic and Kantor (1997). They were also asked to rate the effectiveness of the *eLibraryHub* from "1" (most useful/usable) to "5" (least useful/usable). The purpose was to find out if the *eLibraryHub* fulfilled users' needs, if there was a difference in satisfaction level for different factors, and if users found the *eLibraryHub* equally useful and usable.

To study *user intent and user perception*, six statements were presented and the users were then asked whether they agree of disagree with it. They were:

- I can obtain the resources and services I need when using *eLibraryHub*

- Using *eLibraryHub* would enable me to accomplish my task or project more effectively
- I find *eLibraryHub* easy to use
- My interaction with *eLibraryHub* is clear and understandable
- Assuming I currently use *eLibraryHub*, I intend to continue my use in future
- I intend to increase my use of *eLibraryHub* in future

The statements were adapted from the study by Hong, Thong, Wong, and Tam (2002) to determine user acceptance of the Open University of Hong Kong's E-Library. Likert scales (1-5) with anchors ranging from "strongly agree" to "strongly disagree" were used for all statements. Respondents were requested to select the category that corresponds most closely to their responses. The statements were to serve as an initial stimulus, and the response categories could be used to measure reactions and assess respondents' attitudes or opinions. Five response categories were used to allow for sufficient information without exaggerating the decision-making abilities of the respondents (Gray & Guppy, 1994).

For *user intent*, the following question "How often do you access *eLibraryHub*?" was also asked.

The purpose was to determine if the *eLibraryHub* was used on a regular basis, if users would keep using it, and even increase their usage. For the area of user perception, the purpose was to examine users' perceived usefulness and ease of use of the *eLibraryHub*.

## Protocol and Target Respondents

The questionnaires were disseminated in two modes, namely in hardcopy via person-to-person and softcopy via e-mail attachment. They were collected over a period of six weeks from March/April 2003. A total of 107 respondents completed the questionnaire, out of which 40 of them were returned via e-mail.

The completed questionnaires were checked to ensure there were no missing or ambiguous answers. A minor problem occurred for three respondents who were Macintosh users. The Microsoft Word format for the softcopy version of the questionnaire was incompatible and their replies could not be read properly. The respondents were thus requested to re-send their answers as part of the text message and not as an e-mail attachment.

The target respondents of this study were library users, namely students (tertiary level and above) and working adults, spanning the age group of 18-44. This group accounted for almost 60% of the resident library book borrowers (Yeo, 2002) and constituted more than 63% of home Internet users (Infocomm Development Authority of Singapore, 2001). They would usually need to search and find information in the course of their schoolwork and jobs. The respondents were recruited from fellow course mates and friends and were chosen on the only condition that they belonged to one of the age groups mentioned earlier.

# FINDINGS AND ANALYSIS

## Demographic Characteristics of Respondents

The sample population of 107 respondents was almost split in half by gender, with males constituting 49.6%; 75.7% of the respondents were between 25-34 years of age, and 89.7% held degree qualifications and above. The high proportion of respondents in these categories could be due to the fact that they were recruited from fellow course mates and friends who shared similar backgrounds. Majority of the respondents (65.4% of the sample) were working persons. The occupations of the working persons varied from professional, administrative and managerial, technical, sales and marketing, and service-related. The percentage of the *eLibraryHub* users was 36.4%. Below are findings on user intent, user satisfaction and user perception. More detailed analyses found in Khoo, Chan, Theng, and Buddharaju (2004).

## User Intent

Almost 95% of the *eLibraryHub* users accessed it less than once a week. 66.7% of the users agreed or strongly agreed with the statement that indicates their intention to continue using the *eLibraryHub*. However, only 35.9% agreed or strongly agreed with the statement that indicated the intention to increase their usage. This could mean that existing users are generally satisfied with the *eLibraryHub*, but more could be done to increase their usage level.

## User Satisfaction

Users rated favourably their satisfaction of the availability, accessibility, quality, and effort of use of the *eLibraryHub*'s resources and services as well as its overall effectiveness. On a scale of "1" (most satisfied) to "5" (least satisfied), the *eLibraryHub*'s services received marginally higher mean ratings (2.71 to 2.87) than the resources (2.97 to 3.03) for the four factors. Overall, users rated the *eLibraryHub* to be slightly more useful (mean=2.82) than usable (mean=2.95), where usefulness was defined as "providing useful information and ser-

vices," and usable was defined as "easy to use" in the questionnaire. This could mean that users are generally satisfied with the usefulness of the *eLibraryHub* but more could be done to improve its ease of use.

Correlation analysis was done to see which user satisfaction factors are related to overall effectiveness of the *eLibraryHub*. The Pearson *r* was calculated for each pair of variables. Statistical tests were also carried out to determine whether the calculated value of *r* is significantly greater than 0. The t-statistic was used for the test and p-values of 0.05 and below were considered statistically significant. From the correlation results, it could be observed that almost all but four correlation pairs were found to be statistically significant. For overall usefulness, the strongest positive correlations were with the *accessibility* (r=0.503, p=0.002), *availability* (r=0.490, p=0.002) and *effort of use* (r=0.462, p=0.004) of resources. For overall ease of use, the strongest positive correlations were with *effort of use* (r=0.701, p=0.000), *accessibility* (r=0.550, p=0.000) and *quality* (r=0.448, p=0.005) of the resources.

### User Perception

From the results, it could be gathered that users perceived the *eLibraryHub* as generally quite useful and easy to use. In terms of perceived ease of use, 61.5% of the *eLibraryHub* users agreed that it is easy to use and 46.2% agreed that their interactions are clear and understandable. In terms of perceived usefulness, 51.3% agreed that they can obtain the resources and services they need when using the *eLibraryHub*. However, only 33.3% agreed that using the *eLibraryHub* would enable them to accomplish their task or project more effectively. This might seem that users perceived the *eLibraryHub* as more easy to use than useful. Yet, from their satisfaction ratings, they seemed less satisfied with this perceived level of ease of use compared to the level of usefulness. This reinforces the idea that more could be done to improve the ease of use of the *eLibraryHub* for its users.

## CONCLUSION AND FUTURE WORK

This article reported a quantitative study evaluating the effectiveness of the eLibraryHub from users' perspective, looking at users, uses, and usability issues of the DL. Results showed that users rated favourably their satisfaction of the overall effectiveness and usability of eLibraryHub.

As this study explored usability issues when accessed from the *eLibraryHub* directly, but not via the eCitizen Centre homepage, it is recommended that future work should study user interactions when accessing eLibraryHub from the eCitizen Centre. The size of the sample should be increased and responses should be gathered from participants of more diversified backgrounds. Interviews, focus group discussions, or further qualitative studies could be done to obtain more in-depth information and to further examine user perceptions. The study could also be further developed to connect the perceived value of DLs with appropriate economic indicators. This could then help to provide a more tangible means of prioritizing the development and improvement of usable and useful DLs in particular, and digital government Web sites in general.

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## KEY TERMS



**Digital Government or E-Government:** Digital government is providing online government services, replacing old bureaucratic service lines with accessible information and services offering a "one-stop-shop" to many government services through the state's Internet portal. It is available 24/7, directly from the desktop, using powerful new technologies like digital signatures and electronic forms.

**Digital Library:** They mean different things to different people. The design of the digital libraries is, therefore, dependent of the perceptions of the purpose/functionality of digital libraries. To the library science community, the roles of traditional libraries are to: (a) provide access to information in any format that has been evaluated, organized, archived and preserved; (b) have information professionals that make judgments and interpret users' needs; and (c) provide services and resources to people (students, faculty, others, etc.). To the computer science community, digital libraries may refer to a distributed text-based information system, a collection of distributed information services, a distributed space of inter-linked information system, or a networked multimedia information system.

**Electronic Library Services:** ISO/DIS 2789 defines them to include the OPAC, the library Web site, electronic resources, electronic document delivery and internet access offered via the library, supplied either from local servers or accessible via networks.

**Usability:** ISO 9241-11 defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." Usability of hypertext/Web is commonly measured using established usability dimensions covering these categories of usability defects such as screen design, terminology and system information, system capabilities and user control, navigation and completing tasks.

**Usefulness:** This is debatable. Some make the distinction between usability and usefulness. Although it is impossible to quantify the usefulness of a system, attempts have been made to measure its attainment in reference to system specifications and the extent of coverage of end-users' tasks supported by the system, but not on end-user performance testing.

# Usenet and the Proactive Ombudsman

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## INTRODUCTION

There is hardly any interest in Usenet in governmental circles at the moment. That is not surprising, given that the government's task is to organize society, while for Usenet, spontaneity is extremely important. However, it is still worth investigating whether government and Usenet can grow toward one another. Usenet can become a "public city park" of the Internet, as suggested by Stewart, Gil-Equi, and Pileggi (2004). They overlook this possibility, although Usenet meets a number of the basic conditions. It is an open, non-purposive space and "provides a place where different people cross paths, without necessarily interacting all the time" (Stewart, 2005, p. 356). The conversations in that city park can contribute to democratic decision-making or to administrative objectives, if they lead to anything. A system of order imposed from above will be suffocating. This article outlines a method of ensuring that those conversations are given a focus. Government itself can then ensure that Usenet conversations have a focus by providing and collecting information, while respecting other users, as an ordinary user.

## BACKGROUND

According to Hauben and Hauben (1997), "Usenet was born in 1979 when Tom Truscott and Jim Ellis, graduate students at Duke University in North Carolina, conceived of creating a computer network to link together those in the Unix community." (p. 39). Their idea was for computers to automatically call one another to see whether there were any changes in their Usenet databases. If there were any changes, they would be downloaded to the caller computer. Any user would be able to post a message somewhere within the Usenet system; that message would then be distributed throughout that system. In other words, people would reply to one another.

Usenet, in fact, went on to become the poor man's ARPANET (later: World Wide Web). In order to access ARPANET at that time, one needed about $100,000 and some political connections; in other words, ARPANET/World Wide Web was a system for use by large institutions. Unlike ARPANET/World Wide Web, Usenet is available to any user, as both consumer and producer of information. Moreover, Usenet allows the recipient to determine what he or she wants to receive, whereas ARPANET determines centrally what is displayed. A Usenet recipient also selects the postings he or she wishes to download and determines the format in which he or she wishes them to appear; in order to do this, he or she makes use of a "newsreader." The various contributions in response to postings can be categorised into "threads," meaning that one can see in graphic form how a particular interchange is progressing.

Initially, new communication techniques are used by the relevant experts and are only discovered by the general public at a later date. Usenet was no exception: the experts were pioneering computer users and it was not until the late twentieth century that the general public began to make use of the system. Hauben and Hauben (1997) and many others were extremely enthusiastic about the communicative power of Usenet, identifying a new democratic élan within it that created a lively and creative community. Hauben and Hauben's book was written shortly before a deterioration set in in that respect. The poor man's World Wide Web became the scene of a kind of warfare. The absence of an institutional framework was celebrated as anarchy, at the cost of the exchange of actual substance. However, a number of "old boys behind closed doors" (Lovink, 2003, p. 258) continued to believe in the communicative value of Usenet and—despite the impending "information overload" (Durlak, O'Brien, & Yigit, 1987)—made great efforts to preserve the good manners developed in the period when Usenet had been the preserve of the experts (Moreas, 1998).

## FLAME-WARS

Early users of Usenet were still building up the Usenet community, and everyone involved could make his or her contribution. The later Usenet, by contrast, is seen as a finished technical infrastructure. A number of "netiquette" rules, both written and unwritten, specify how one is meant to behave. There is no institution where further development can take place and there are no effective sanctions if one breaches the rules.

In contrast to the community spirit of the early Usenet, participants now feel that they are at liberty to express

themselves freely, with no obligations and without being held accountable. In such a climate, it is easier for "flame wars" to get started and to rage for longer. This climate of misunderstanding and quarrelling makes Usenet useless for governmental purposes.

"Flaming" means verbally abusing someone by posting angry or derogatory messages. A "flame war" is an interchange of such postings; it may go on for weeks. Such conflicts are encouraged by the fact that there are no longer any accepted bounds of behaviour, because one is dealing here with contact that takes place without the other person or persons actually being present (Köhler, 1999, p. 150; Schroth, 2002, p. 129). If one's interlocutor is in fact present, one takes account of him, either consciously or unconsciously. A Usenet poster is only required to qualify his remarks if the urge to do so comes from within himself (Hauben & Hauben, 1997, p. 25). Some posters clearly enjoy starting a flame war and then keeping it going; in some cases this leads to their bringing about the demise of an interesting newsgroup (Lovink, 2003, p. 124).

Methods are being conceived to prevent flaming. Hauben and Hauben (1997, p. 25) and Shirky (2004), for example, think that the solution is improved software. Shirky refers to a number of initiatives and ideas to set up the software in such a way as to prevent disruptive action by individuals. He calls for experimentation with such techniques so as to find a balance between the freedom of the individual and the interests of the group which that individual has joined.

Slashdot (a "virtual community" concerned with technical aspects of the Internet) makes use of a technique whereby an appeal is made to the actual group processes as a means of keeping individual behaviour within the desired bounds: "Instead of assuming that all users are alike, the Slashdot designers created a karma system, to allow them to discriminate in favor of users likely to rate comments in ways that would benefit the community" (Shirky, 2004). Slashdot allows a specially selected group of users to indicate the value of contributions for the group as a whole. Jordan, Hauser, and Foster (2003) seek the solution in constructing the World Wide Web in such a way as to restore trust between people. They hope to achieve this by taking measures to prevent the increasing fragmentation of the Web (stable identity, increased accessibility of virtual communities).

Lee (2005) notes that "... there seems to be the regular's inclination to accept relativism in online debates and flaming." O'Sullivan and Flanagan (2003) also point out that what a third party may consider to be a clear case of "flaming" can in fact be of value to the recipient of the message.

According to Millard (in Lee, 2005), the realisation that others do not want to be convinced will not mean that people will avoid clashes because "… the desire to achieve persuasion provides the initial and constant motivation for rhetoricians to perform."

## THE THREAD PRESIDENT

Flaming is a case of using improper means to get people to concede that one is right. It is in fact a kind of battle for the pulpit, a struggle to get people's attention for the fact that one is right. One tried-and-tested method of settling such a dispute is to give each speaker a certain amount of time to speak. On each occasion, each of the "truths" is dealt with separately and ultimately the listeners decide what appeals to them. This technique revolves around the chairperson who apportions the attention. Something like this can also be developed for Usenet, but suitable agreements need to be made. Within the culture of Usenet, however, there is a fear that there will be a loss of spontaneity if such agreements are indeed made. In my opinion, that fear is groundless. There will still be a lot of spontaneous ideas on Usenet; the only difference will be that they will be assigned a place in the subjective and definitely not coercive order imposed by the thread president.

In order for the system to function, the president must be in a position that is visible for all and he must have certain instruments at his disposal. Whether a thread president stifles spontaneity depends on those instruments. He (the "TP") would be allowed to assess postings by other individuals in a clearly visible manner. In this way, he would indicate the level at which he was managing "his" thread, and what he wanted to talk about. Spontaneity would not be stifled because the TP would only give directions. Despite the existence of the TP function, all the participants would continue to be involved in drawing up and enforcing the rules. Kollock (1996) believes that such involvement is vital for a community.

Each posting responding to another posting would constitute one vote in favour of a particular TP. Each member of the group would be able to become a candidate for the position of TP by simply starting a discussion. This too would allow everyone to continue to act spontaneously. The TP would not be carrying out an assignment from the group and it would be his own ambition that determined how much energy he wanted to put into his thread. In the course of his thread presidency, someone may stand out from the rest. This makes possible a greater social presence (Köhler, 1999 p. 147). The TP would influence the presentation of the postings and in that way a second channel—even a superior one–would be introduced containing evaluative information (even directed towards the person) but in an indirect and non-aggressive

manner. People would therefore be able to take note of the information and then move on to the discussion.

The evaluative TP channel would clarify what users actually mean for one another; one could then draw useful conclusions for future contacts. Common bond groups could be created, with "rewarding interpersonal relationships" then being the "main reason for membership" (Schroth, 2002, p. 172). The TP on duty would assign rewards or impose sanctions, thus creating the common bond that defines a common bond group. There would be an "expectation of something in return," a "confirmation of one's identity," and a "feeling of effectiveness" (Schroth, 2002, p. 172, quotation translated). If friends then wanted to have fun savagely flaming one another, they could do so, with other common bond groups leaving them to get on with it while pursuing their own more profound discussions. All this would be a dynamic alternative to Jordan's "Augmented Social Network" (Jordan et al., 2003). Creating a group by means of the TP system would also be a way of reducing information overflow (Durlak et al., 1987). Each TP would convert the information—the contributions to his thread–into information useful to him and to the other members of the group.

## GOVERNMENT AND USENET

### Many-to-Many

A Usenet based on a TP system would enable government to participate effectively in the options for "many-to-many" communication that have been created by the Internet, with government being just one of the many participants and not a special one. Usenet is an interesting phenomenon from the governmental point of view. In the first place, of course, that is because it is a societal phenomenon (i.e., part of society). But the main reason is that it consists of members of the public, freely and spontaneously engaging in discussion of a variety of subjects. It is discussion that everyone—including government—can follow and in which everyone–again including government as government—can basically participate. Surratt (2001, pp. 79ff) believes, for example, that this can help preserve the nation state and prevent it being submerged by globalisation.

The Internet provides opportunities for many-to-many communication. To that end, scientists and authorities are also greatly interested in the World Wide Web. What will always remain a problem is that efforts to generate many-to-many contacts take place within the framework of one-to-many contact. As Jacobson (1993, p. 197) points out,

*[t]his tendency toward control had been even more pronounced in the plans of ... governmental administration to operate interactive information systems: Political and cultural censorship are built in as a matter of deliberate design. Reciprocity, on the other hand, is excluded.*

Government will always wish to have control of the discourse, while the public will always assume that there is a wish to dominate behind the invitation to participate. Through the World Wide Web, government controls the public space in which it is itself active. Members of the public are enticed in to participate in the discourse within government's own topics and stated interests.

Another obstacle is to be found in the fact that the structure of the World Wide Web creates barriers between the various different types of virtual community. Jordan et al. (2003) refer to them as "walled castles." For businesses and NGOs, this is necessary given the restricted reasons for their presence on the Web. Government, however, is there to serve the public interest, meaning that such barriers are a major obstacle.

Usenet is not a channel for "one-to-many" communication by the institution "government"; rather, its whole point is that it makes possible many-to-many communication. Hauben and Hauben (1997) note: "The very nature of Usenet is communication…In its simplest form, Usenet represents democracy" (p. 48). Someone—anyone—makes an announcement or asks a question, doing so without any frills or trimmings. Anyone else can then reply, again without frills or trimmings. All the various participants in the communication are basically equal.

In short, interactivity within the World Wide Web takes place within an institutional framework; within Usenet, there is interactivity without such a framework. This then raises the difficulty noted by Thiedeke (1997, p. 239) that "a paradoxical feature of performative publicity is that it is simultaneously interactive but uncontrollable (quotation translated)." Performative publicity thus involves a public space within which individuals—with their own specific interests—have an influence. By making use of Usenet, government is seeking out people involved in discussion in their own physical environment and is aiming to key into the subjects that concern them. It is not necessary for the individual to be enticed in and government does not need to put any effort into presenting itself in an attractive manner. Government in fact follows the public discussion, something that fits in with the concept of democracy.

Surratt (2001) measures the quality of the efforts made by government in the context of the Internet by the attractiveness of government Web sites and the extent to which they are interactive; her focus is on the World Wide Web. In this context, I would like to ask—perhaps provocatively—whether Usenet could not in fact become the "poor government's" World Wide Web. After

all, Usenet allows for a great deal of interactivity, without the need for any great effort on the part of government as regards infrastructure. The existing infrastructure could be used and there would be no need to take steps to get people's attention.

## Changing Government

Mosco (2004) investigates the rise of myths regarding cyberspace. Referring to the division of powers, he comments:

*The rise of a horizontal society most of whose members are more or less 'jacked in' to new communication and information technologies, to networks that link people in more than traditional top-down vertical ways, will, the myth teaches, transform power as we know it.* (p. 99)

But then, for Mosco (2004), the transition would seem to mean that the myth desires an end to political power. I would go no further than to say that political power will undergo change. I in fact endorse what is argued by Surratt (2001, p. 84). We should not aim at a state organised on compact, hierarchical lines but at one that is able to respond to networks such as Usenet. When using a TP-structured Usenet, government will need to suppress its tendency to want to immediately impose top-down control. Agre (2003) also realises this: "The role of political organizations must change. An organization no longer needs to carry the full burden of organizing the collective cognition of the social group it claims to represent. (p. 65)"

The Usenet think tank cannot be forced into production via the existing vertical lines of authority. Usenet thinking is spontaneous and will come to an end if government attempts to guide it towards an intended result from a higher rung on the hierarchical ladder. The way for government to acquire a significant role in such many-to-many communication is not by means of its holding any particular position but by deploying knowledge and manpower and by means of cooperation outside Usenet that focuses on Usenet. If government wishes to make use of Usenet, it will need to do so as a kind of "street-corner social worker," at the same level as those with whom it interacts. What is involved is direct persuasiveness. A second Usenet channel created by the introduction of the TP system would make it possible to deploy that persuasiveness efficiently. The work of government would not be hidden within a mass of postings but would be visible in threads clearly labelled by TPs.

Hauben and Hauben (1997, p. 56) see Usenet as a means whereby people can influence government: "Usenet could grow to provide a forum through which people influence their governments, allowing for the discussion and debate of issues in a mode that facilitates mass participation." However, government needs to allow itself to be influenced in that way. For traditional reasons, it is "politics" that is the most obvious institution through which this could take place.

Usenet (or the World Wide Web) has provided democracy with a public space once more, one in which many-to-many contacts are possible. Such contact used to take place in locations like the *agora* of Ancient Greece and similar physical meeting places. One-to-many media such as newspapers, radio, and television did away with the democratic importance of such venues, but editorial offices are a poor substitute. Usenet (or the World Wide Web) can become a venue for democracy (Poster, 2001), allowing for broader and more differentiated participation. A consultative democracy involving all members of society becomes possible once more (Dahlberg, 2001).

But even a democratic public administration would do well to become part of this network. Doing so would be an effective addition or alternative to the collection of information and public enquiry procedures (preparation of decisions) and to providing public information and opportunities for objection and appeal (justification of decisions). Frissen and De Jong (1996, p. 19) note developments in administration in which policy is increasingly being given shape through government participation in networks, with the fundamental principles being differentiation, variety, and pluriformity. In line with this, it is conceivable that government will allow itself to be represented on Usenet by highly trained civil servants who have been assigned a position that gives them freedom to act independently. Such contact with the public does not need to lead to any radically different political structure. In my opinion, those involved in that contact will not acquire power on Usenet from their administrative position, assuming that they are not loaded down with specific responsibilities within the public space of Usenet, and assuming also that their activity within Usenet does not mean that government is bound by what they say there. I would refer to such persons as "proactive ombudsmen." An ombudsman has a critical function with respect to government, but unlike the present ombudsman, "proactive ombudsmen" would not just act subsequently if objections are made, nor would they be bound to particular cases. They would, however, be independent and they would also function as shapers of opinion. They would thus perform some of the tasks currently performed by the press; specifically, they would digest data—the contributions posted by participants—and turn that data into information. The information would then be passed on to the echelons where decisions are traditionally taken. The proactive ombudsman would work in a more targeted manner than the press does and would have immediate and public access to the echelons where decisions are prepared and implemented. He would request information

on Usenet when necessary and would himself provide information as objectively as possible. The Usenet public would thus receive relevant information as and when necessary, namely when it was ready for it, and would take part in a debate that really mattered.

## FUTURE TRENDS AND CONCLUSION

There is little interest at the moment on the part of government in Usenet as a democratic or governmental instrument. It will only be worth government showing such interest when users streamline their communication so as to make it clearer. If the described method catches on, Usenet can develop into a city park while at the same time retaining its spontaneity. It will then be worth investigating whether Usenet can play a role in the democratic and governmental process. Given the nature of Usenet, that role will need to be a submissive one, with government fostering Usenet's spontaneity and also acting spontaneously itself.

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## KEY TERMS

**Consultative Democracy:** Political system that makes possible wide participation by citizens by means of performative publicity (Dahlberg, 2003).

**General Discussion with Depth:** Discussion, without an agenda, whose intention is for at least one of the participants to broaden his horizons. Positioned between a social discussion, in which it is social contact that is primary, and a discussion with a specific agenda and objective.

**Many-to-Many Communication:** System whereby an unrestricted number of parties exchange messages.

**One-to-Many Communication:** System whereby a single party gets a message across to an unrestricted number of other parties.

**Performative Publicity:** A (virtual) meeting place, accessible to all, where people can influence one another and are permitted to do so.

**Proactive Ombudsman:** Civil servant charged with contact between the Usenet public and government. He does not answer to politicians for his decisions in a direct manner. Citizens do not derive rights on his sayings.

**Usenet:** (1) System for exchanging information via the Internet. (2) The social system associated with Usenet in sense 1. (3) The people who make use of Usenets 1 and 2.

**World Wide Web:** System for making information available via the Internet by way of interlinked hypertext documents.

# User Orientation in the Provision of Online Public Services

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## INTRODUCTION

In the context of e-government strategies, governments typically claim that they utilize Internet technology to improve service provision and to better meet citizens' needs. However, the development of front-office e-government applications often seems to be guided primarily by supply-side factors. Many observers criticise that in practice, technological possibilities rather than user needs determine the design and provision of most public online services.

This situation contrasts sharply with the common political intention that the "user—the individual—has to be placed at the centre of future developments for an inclusive knowledge-based society for all" (CEC, 2004). At the root of this contradiction lies technological determinism: the widespread tendency to assume that certain social outcomes are in some way inherent in a technology. A determinist view implies that it is sufficient to "unleash" a certain technology in order to make its potentials for improving human life come true. It can, however, easily be shown that technological determinism is a myth and that technology, while enabling certain beneficial developments, is in no way a sufficient condition for these (Webster, 2002). Rather, society has to devise policies which effectively strive to use technology to the largest possible benefit of all.

There is, thus, no reason to be complacent about the high degree of satisfaction which users show with e-government services (CEC, 2003). A lot of research has shown that users tend to be satisfied with online public services: Lassnig, Markus, and Strasser (2004b) found through representative surveys that over 90% of citizen and over 80% of business users indicate that they would use the online channel for e-government service provision again. At the same time, however, a large percentage of potential users of e-government state that they still prefer to access government services through traditional channels (mostly face to face). Thus, a positive attitude towards online government services seems to exist only among current users, while most nonusers tend to dismiss their usefulness.

Such polarisation between users and "e-government refusers" points towards the need for better understanding of facilitators and barriers to uptake. The issue is of special relevance because the main services of public interest (which, of course, need to be defined) must be accessible to *every* citizen. Additionally, for many services there exists a public interest to have as many users as possible (e.g., education, civil participation). It become clear, therefore, that user orientation must go beyond mere accessibility and also fully address questions of motivation.

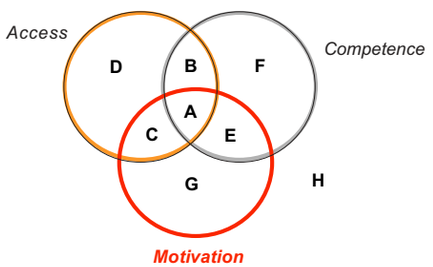
Recent evidence, from the UK especially (Curthoys & Crabtree, 2003), suggests that online availability of a core set of public services alone is unlikely to lead to strong increases in take-up of e-government. The UK government has set a target of getting all public services online by 2005, but this contrasts with low usage rates: About 70% of services were online, but many of these services were hardly being used at all. Curthoys and Crabtree (2003) suggest that encouraging more citizens to use online services should be made the "unequivocal top priority" by the government in its e-government strategy, even if this means downgrading quantitative targets.

What, then, must be done to better cope with the diversity of user needs and preferences in the development of online public services? This article outlines the main challenges related to user orientation of end-user e-government services. Disparities between citizens in the areas of access, competence and motivation appear to be of special relevance in this regard. Against this background, the article suggests a conceptualisation of user orientation of online public services which takes account of all main stages of the service delivery process. This framework may help providers of e-government services in the ex-ante assessment of online services to be developed. The final section includes some conclusions and a brief look into upcoming trends and challenges in the area.

## MAPPING USERS

Public services are defined here as front-office government services. The focus is on delivering such services using online computer connections, either entirely or at least to a significant degree. The relevant issues relate to the improvements that can be achieved in comparison to 'traditional' delivery channels. These improvements can be twofold—first, they can relate to the efficiency of

*Figure 1. Access, competence, and motivation as key factors determining uptake of e-government services (eUser, 2005)*




| Type | Description |
|---|---|
| **A** | Users of online public services |
| **B** | Lack of motivation but access and competence given, most likely from user experience at work or from basic education. Large share of "self-excluded". |
| **C** | Access and motivation given, but lack of competence. Traditional target for training measures, high probability of success of such measures. |
| **D** | Only access given, but neither competence nor motivation. Severe barriers exist before online public services will be used. Likely to apply for many older persons who live in households together with their children who provide the access. |
| **E** | Only access is missing. The bottleneck here is infrastructural equipment, which may need to be provided by the state as in the case of free public Internet access points. Also applies to many disabled who need special devices and services to access mainstream computer applications. |
| **F** | Only competence given, most likely from basic education. Motivation is likely to be the bottleneck. |
| **G** | Only motivation exists. Applies for parts of the poor population who show a strong commitment to society, but lack the means to gain competence and access to the Net. |
| **H** | None of the three conditions exist. Likely to apply to significant parts of low qualified, low-income population in the EU, including poorly integrated ethnic communities. |

service provision. Thus, e-government can provide a new impetus to address the ongoing challenge of how to raise the quality of public services; second, improvements can aim to widen the reach and reachability of these services by actively incorporating the needs of all potential users as integrative part of the whole delivery process.

Users of online public services are a highly differentiated group. This is often ignored as governments are planning the "roll-out" of public online services according to simplistic assumptions about diffusion dynamics. In reality the notion of an "average user" (as it has been applied by the United Nations (2003) for a study on e-readiness of public administrations) can be misleading because the main services of public interest must be accessible to everybody rather than only the majority (or minority?) of users whose capabilities and preferences are well represented by the statistical "average". For this reason, an analysis of barriers to uptake needs to shed more light on types of users and their specific requirements.

For the purpose of this article, the analysis carried out by Viherä and Nurmela (2001) is of special value. They have introduced the concept of communication capabilities. This comprises not only access to information and communication technologies and competence in using them, but also the *motivation* for actively doing so. Figure 1 shows how different combinations of (lack of) access, competence and motivation lead to target groups which need to be carefully distinguished when exploring barriers to uptake and devising strategies for inclusion.

In order to apply the notion of communication capabilities to usage of online public services, we need to understand what access, competence and motivation mean in the context of e-government applications.

- **Differences in Access:** Using public online services requires access to the Internet for private usage. When looking at Internet access at home, and additionally usage of public Internet access points or in educational institutions, libraries, Internet cafés, and so forth, available data quite clearly indicate that access is far from ubiquitous even in Europe. This applies, in particular, when considering that many advanced online services require a broadband access to function efficiently.

According to data from Eurostat (2005), the share of households with access to the Internet varies between 16% in Lithuania and 78% in the Netherlands. The national figures for broadband access range from 1% (Greece) to 54% (Netherlands).

Differences in access can also be the result of special requirements of users (Roe, 1995). This is because the ability to use online applications through the usual end devices (mainly personal computer) can be limited by functional restrictions. The best available estimate on how widespread these are in the EU comes from the SeniorWatch study (2002). It found that 17% of the EU population in the age group 50-59 have severe functional restrictions (with regard to either seeing, hearing or dexterity), and an additional 41% have "some" restrictions of these kinds. Persons with functional restrictions may need special equipment to be able to access mainstream Internet-based services, such as enlarged keyboards and monitors, or voice input/output. Members of ethnic minorities are often facing language barriers, if they do not feel confident enough to understand the language in which public Web sites are penned. This is where access is interrelated with the second condition for communication capability, namely competence.

- **Differences in Competence:** To properly use online public services, citizens still need to have considerable computer and Internet skills. Endowment with these skills is highly correlated with usage experience, which means that skills are obtained mainly by doing rather than by upfront methods of learning (Lassnig, Markus, & Strasser, 2004a). The share of citizens who are able to use online services can therefore be estimated by consulting national usage statistics. More direct indicators on digital literacy are available, for example, from SIBIS (2003). Available data show a strong positive correlation with household income, social grade and educational attainment, and a strong negative correlation with age.

  In addition to computer skills and ability, the notion of competence related to the use of online public services also includes competence in handling public services, irrespective of the channel through which they are received. A factor in this is literacy in the wider sense of the term, meaning the ability to grasp and process informational content. Data on literacy has been systematically collected by the OECD through the International Adult Literacy Survey (OECD, 1997). The analysis showed that "low literacy is a much larger problem than previously assumed in every [OECD] country surveyed: from one-quarter to over one-half of the adult population fail to reach the threshold level of performance considered as a suitable minimum skill level for coping with the demands of modern life and work" (OECD, 1997, p. 5). This means that low literacy levels is likely to also act as a severe barrier to take-up of online public services, as long as these require more advanced literacy skills than traditional methods of (face-to-face) provision.
- **Differences in Motivation:** Lack of motivation can here be understood in two ways: First, as lack of willingness to interact with providers of public services in general: This means a passive attitude towards public services as opposed to a more customer-like behaviour. It can be rooted in general attitudes towards society. It can, of course, also result from a low perceived utility/relevance of the service on offer. And second, as lack of willingness to use the *online* channel for the purpose of interacting with providers. As Viherä and Nurmela (2001, p. 13) point out, it is often the telephone rather than the Internet which is citizen's preferred tool for societal communication. They conclude from this that "when services and commerce are being launched to an ever-increasing degree in the network, special care must be taken to guarantee the availability of services also by telephone". Findings from SIBIS (2003) showed that even among regular Internet users, the majority would prefer to use traditional channels such as the telephone, postal mail, or face-to-face exchange rather than the Internet to obtain services from government. Underlying reasons also tend to include security concerns, which often make would-be users shy away from interacting electronically with government.

## USER ORIENTATION OF ONLINE PUBLIC SERVICES

Research has identified a number of reasons why citizens use, or do not use, specific services in general and online services in particular. Usability (see below) is only one aspect of this. Optimising usability alone, although certainly a top priority, will not necessarily mean that take-up rates of online public services will improve significantly.

The literature on user satisfaction lists a large number of quality determinants with regard to services. Most of these are derived from asking users, using focus groups or more structured methods. Johnston (1995) compiled 18 factors which had been identified in empirical research: access, aesthetics, attentiveness/helpfulness, availability, care, cleanliness/tidiness, comfort, commitment, communication, competence, flexibility, friendliness, functionality, integrity, reliability, responsiveness, and security. Parasuraman and Berry, who developed the

influential SERVQUAL methodology of measuring customer perceptions of service quality (Parasuraman, Zeithaml, & Berry, 1988), presented a set of five quality dimensions which has found wide application. These are: tangible factors, reliability, responsiveness, assurance, and empathy.

When assessing user satisfaction one needs to be aware of the fact that satisfaction is heavily influenced by expectations (MORI, 2002). Indeed, research on service quality started out in the early 1980s by suggesting that perceptions of service quality stem from a comparison of what customers feel a provider should offer (expectations) with the way the service is actually performed (Grönroos, 1982; Lewis & Boom, 1983).

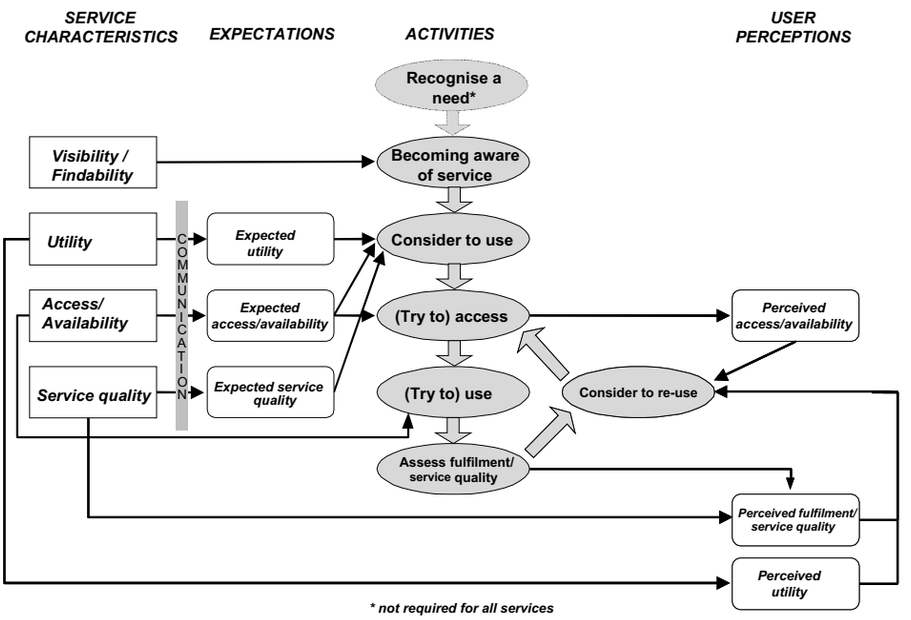
The understanding of determinants of perceived service quality has been developed for service delivery through traditional channels, mostly "people-delivered services" (Zeithaml, Parasuraman, & Maslhotra, 2001). Findings from this research need to be adapted before being applied to online services. For services that are transmitted via technological systems such as the Internet, we need to distinguish between two main components in user requirements: the service (content) component and the technology component. The latter is relevant because citizens need to be able and willing to access and apply online computer technology for using online services.

User acceptance of technology has been researched against a number of theoretical perspectives. Arguably the most important are the innovation diffusion theory (Rogers, 2003), which tries to identify the perceived characteristics which influence the adoption of a technological system by users; and the Theory of Reasoned Action (Fishbein & Ajzen, 1975), which explores how user beliefs and attitudes are related to individual behavioural intentions with regard to a technological system. Based on the theory of reasoned action, the technology acceptance model (Davis, 1989) is one of the most established models to explain the adoption of technology at the level of the individual. Davis (1989) distinguishes between perceived usefulness ("the degree to which a person believes that using a particular system would enhance his or her [...] performance", i.e., utility) and perceived ease of use ("the degree to which a person believes that using a particular system would be free of effort"). The model has been confirmed in general by a large number of replication studies (Zeithaml et al., 2001, p. 15), which explains its big popularity among researchers.

On the basis of this theoretical and empirical research, the following elements of user orientation for online public services can be distinguished:

- **Visibility/Findability:** Means the degree to which the service is known to potential users, that means awareness about the service in the target population. Visibility can be influenced/managed by providers through publicity strategies. Services are, however, also to a certain extent visible even if no promotion has taken place. Awareness might result from unintentionally coming across a service, that is, while surfing on the Internet. This relates to the definition of findability used in the context of Website promotion strategies, which can be structured to a variable degree.
- **Utility (Usefulness):** Refers to the utility of the service from the viewpoint of the individual (actual or potential) end user. Utility might be derived from the *relevance* of the service to meet particular needs of the user (i.e., in the case of many health services) and the *suitability* for personal circumstances. It also comprises the variety of tangible aspects, such as time savings, cost savings and so on resulting from the service itself (rather than the way it is delivered—see service quality below). Finally, it can also incorporate less tangible aspects, such as personal intrinsic gratification that can be derived from the fun of, for example, participating in an attractive learning experience/training course. Other social aspects such as prestige and social desirability may also play a role.
- **Access/Availability:** This is the degree to which the distribution channels and technologies employed allow all types of potential users access to the service in question. Accessibility is a function of (a) *Findability,* in the narrow sense, the ease with which the service can be located intentionally; (b) *Affordability*, the degree to which the public can afford the cost to access and use the services in question; (c) *Time independence*, the extent to which the service is accessible at any time when demand occurs; (d) *Location independence*, the extent to which the service is accessible from any fixed or mobile location; (e) *Platform independence*, the extent to which the service is accessible through various alternative systems (hardware and software); (f) *Accessibility*, suitability for persons with disabilities; (g) *Availability* of services in a way that is easily accessible for persons which belong to social minorities such as immigrants.
- **Service Quality:** Encompasses the ability of the service to fulfil the expectations of the user (i.e., lead to satisfaction with the service) with regard to a large number of attributes, as first conceptualised by the SERVQUAL school of researchers (Zeithaml et al., 2001). Adaptation for the subject of online public services, the following factors are the main determinants of service quality:
  a. **Content Quality:** That is, conformance to legislation and professional quality (correctness/

*Figure 2. eUSER conceptualisation of user orientation (eUser, 2005)*




validity, comprehensiveness, reliability, accuracy). Note that content quality is something that usually cannot be fully assessed directly by users, since they lack the professional knowledge for this. From user's viewpoint there is, therefore, a demand for signifiers that give them trust in the quality of the content.

b. **Flexibility:** Involves choice of ways in which the service is used and delivered, and choice of content (the width and broadness of the service offer).

c. **Usability (Ease of Use):** Means the capability of all supported paths towards task accomplishment, to "maximally fit" individual users' needs and requirements in the particular context and situation of use (Shackel, 1984). This includes elements of efficiency (Is the process is simple to use, structured properly, and requiring only an appropriate minimum of information to be input by the user?), learnability and memorability. Web-site-based services with a high usability contain functions that help the user find what they look for without difficulty, and allow them to manoeuvre easily and quickly back and forth between pages and functions. This requires the ability of the system to take advantage of users' skills and thereby to function well in a broad range of real world situations. Error handling, that is responsiveness in the case of technical problems (ability to get fast assistance if there is a problem or question) and system reliability (correct technical functioning of the technical equipment and related support services) are also important.

d. **Assurance/Trust:** Refers to the degree to which the service in question (and the ways it is provided) infuses trust and confidence. It is due to the reputation of the site and the services it offers as well as clear and truthful information presented. There is a close relation to what above has been defined as the professional quality of services: since end users cannot always assess quality directly, they want assurance that the content is of a certain quality. Another aspect of trust concerns protection from security threats and privacy offences.

e. **Customisation/Personalisation:** How much and how easily the service can be tailored/ adapted to individual users' preferences and needs.

## CONCLUSION

The model in Figure 2 puts the main elements of user orientation, as discussed above, in relation to the process

of uptake of a given service by a potential user. The model can be used to devise strategies for increasing service take-up, targeted at specific target groups. It distinguishes between "real" service characteristics, expectations regarding service characteristics (which are the result of the communication of "real" service characteristics through marketing, social networks, etc.), the activities of (potential) users of public services, and the perceptions which result from these activities.

Note that the figure does not differentiate between delivery/transaction channels (online vs. offline). It also tends to suggest that there is a logical progression from recognising a need via trying to access a service to using the service. Of course, at each of the steps during the process individuals might decide not to (try to) use the service if they feel that expected returns do not compare well with efforts/costs.

This article has briefly presented arguments for a strategy towards public online service provision which is guided by the needs, capabilities and preferences of potential users. It has argued that the traditional focus in e-government development on supply-side measures has been misguided. We cannot any longer assume that a high-quality online service will automatically lead to take-up by all or even the majority of the target population. The reasons for citizens not to use online public services are various and often complex. Without a better grip on the diversity of user groups and their specific attitudes and capabilities with regard to using the Internet and public services in general, e-government projects will fail to reach their targets. More and better information on user characteristics, needs, preferences, perceptions and attitudes is needed before a front-office e-government project can hope to be truly oriented to citizens.

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## KEY TERMS

**Access/Availability:** The degree to which the distribution channels and technologies employed for delivering an online public service give all types of potential users adequate access to the service in question.

**E-Government Service Quality:** The ability of an online public service to meet the service-specific demands of the user, that means lead to user satisfaction with the service. Relevant aspects of quality in this context include content quality, flexibility offered, ease of use (usability), assurance and trust, and customisation/personalisation.

**Findability:** The ease with which the target group of an online public service can locate the service after an interest or need has arisen. From a user orientation perspective, findability needs to be optimised also for persons who have only very loose knowledge about how the service they seek might be called or described, and by whom it might be offered.

**User Orientation:** The extent to which an online public service is offered (that means designed, marketed, provided, evaluated) in a way that fully addresses the needs/requirements and preferences of each member of the target population. This implies that the whole diversity of user characteristics and requirements is taken into account.

**Utility:** From the viewpoint of the individual end user, an online public service provides utility through its relevance for meeting particular needs of the user in a way which is tailored to the personal circumstances of the user. Utility here derives from, for example, the service outcomes themselves, time and cost savings, personal intrinsic gratification, social prestige and so forth.

**Visibility:** The degree to which on online public service is known to potential users, that means awareness among the target population about the service. Visibility can be influenced/managed by providers through publicity strategies.

# Using Digital Hotlines in an Anti-Corruption Campaign



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## INTRODUCTION

Throughout the world, people are just as concerned about corruption as they are about unemployment, poverty, and physical security. Governments can support citizens in their fight against corruption by using digital hotlines to investigate wrongdoing and to strengthen fraud-prevention efforts. Best practices in managing digital hotlines can be packaged into a module that is rolled out to all units of government from the national to the local level.

## BACKGROUND

Every year, Transparency International (TI) prepares a barometer of global corruption, and in 2004, TI interviewed 50,000 people in 60 countries. TI reported that for 2004 and 2003, the public perceived political parties as the sector most affected by corruption, followed by parliament/legislature, the police, and the legal system/judiciary. Similarly, when asked to rate the impact of corruption on different spheres of life, people ranked 70% for politics, 60% for business, and 40% for family and personal life.

Petty administrative corruption also was mentioned by 78% of respondents as a concern. Worldwide, one in 10 persons interviewed said someone in their household had paid a bribe in the previous 12 months.

Corruption, especially in the public sector, is a worldwide epidemic that is growing rather than shrinking. TI reported that for 2004, 43% of respondents expected the level of corruption to increase in the next three years (Transparency International, 2005). With corruption on the rise, governments will need powerful and effective tools to combat fraud and abuse.

## ESTABLISHING HOTLINES

One such powerful tool is a digital fraud hotline, which should be integrated into an anti-corruption campaign. Even though some countries have passed whistle blower protection laws, their application is riddled with problems, and the whistle blower often ends up frustrated, disappointed, and unemployed (Calland & Dehn, 2004). Furthermore, the original problem that was identified by the informant often is not corrected, which discourages public servants from blowing the whistle (Devine, 2004). A conventional hotline using telephone and mail allows citizens to remain anonymous when filing a complaint, thus reducing the fear of retaliation, which may motivate them to actively fight corruption (USGAO, 1988). A digital hotline multiplies the opportunity for safe reporting to a vastly larger audience.

### How Hotlines Function

A hotline is a system that facilitates the reporting of wrongdoing or violations of the code of conduct directly to the sponsoring organization (SO). If the SO initiates an investigation, it may result in administrative sanctions according to the rules of the SO or in legal complaints filed with the national judicial system. Technology for hotlines has advanced from telephones or physical snail mail to Internet technology that now supports sophisticated features such as the following:

- Receiving and storing a large number of complaints from informants.
- Allowing informants to remain anonymous, if they so chose.
- Rapid notices to officials of an SO when a complaint is received.
- Supporting a real-time online dialogue between an informant and officials of the SO who are in different time zones.
- Classifying complaints by a variety of categories and characteristics.
- Ability to quickly adjust the classification scheme of complaints as needed.
- Ability for informant to log in (anonymously) and to track progress on his or her case.
- Maintaining a log of how a case is investigated.
- Recording the outcome of a case, such as actions taken against an employee and whether assets were recovered.
- Quickly customizing reports for detail and summary statistics.

- Preparing and distributing reports automatically on a schedule.

The sophistication of digital hotlines has been fueled by the fact that managing hotlines has become a growth business in the last 15 years. The number of vendors that provide digital hotline services has been growing because fraud and corruption are alive and thriving.

## The Global Fight Against Corruption

Many public interest organizations are fighting corruption in both the public and private spheres. Notable international efforts include the drafting of a Convention Against Corruption that is sponsored by the United Nations Office of Drug Control (UNODC). This convention was ratified by 37 national governments, and it entered into force on December 14, 2005 (UNODC, n.d.(d)).

## How Can the Digital HotLine Support Anti-Corruption Efforts?

The UN Convention Against Corruption recommends best practices for governments to foster honesty and integrity of citizens as they fulfill their obligations, whether in the public or private arena. With 71 articles organized into eight chapters, there are four main pillars of the anti-corruption model that are listed as follows (UNODC, n.d.(a)):

1. National anti-corruption policies and mechanisms
2. Strengthening judicial integrity and capacity
3. Promoting integrity in the public and private sectors
4. Denying the proceeds of corruption and recovering illicit assets

## Creating a Hotline is a Best Practice

Article 8 of the convention recommends developing a code of conduct for public officials as well as a system to facilitate the reporting of acts of corruption to appropriate authorities

*UNODC notes that critical components in enforcing a standard of conduct include ethics training, credible public complaint systems, public awareness about their rights, and appropriate disciplinary measures.* (UNODC, n.d.a, p. 6)

## Who Owns the Hotline?

Developing national policies, strategies, and action plans is critical to effectively fighting corruption. Article 5, Paragraph 1 of the convention stipulates that states shall develop and implement coordinated anti-corruption policies that are based on laws and good management principles such as integrity, transparency, and accountability and that encourage the participation of society (UNODC, n.d.(a)).

This can be accomplished by creating a special anti-corruption body, which Article 6 recommends establishing, to oversee and implement the policies outlined in Article 5 as well as to increase and disseminate knowledge about preventing corruption (UNODC, n.d.(a)).

Therefore, Article 6 supports establishing a governing body over the hotline to oversee management, which mirrors the same concept that there should be high-level governance over information technology resources (IT Governance Institute, n.d.). A key responsibility of this governing body over the hotline would be to review all complaints filed to ensure that there is follow-up on all serious cases that are reported and that this oversight would extend to protect the whistleblower, as well (USGAO, 1989). Hopefully, this governing body also would oversee the overall anti-corruption efforts of the government entity, and a hotline would be only one responsibility.

Article 6 also recommends that this governance body be independent and free from any undue influence. It should have the power to advocate for and/or resolve conflicts in laws and regulations so that there is a consistent policy that protects whistle blowers in all cases. Oversight is needed to ensure that public agencies do not bury complaints and punish the whistle blower for political reasons. One troubling trend is that national laws can negate whistle blower rights in favor of protecting national security, which denies the public's right to know about wrongdoing in this sector (Devine, 2004).

Members of this hotline governing body should not come exclusively from public service but also should include members of NGOs and community-based organizations that can bring independence to the exercise of oversight. Governments should reach out to find suitable NGOs to serve on such a body. Once again, Article 13 of the Convention confirms the importance of involving NGOs in efforts to prevent and fight against corruption and to raise public awareness about the threats that corruption poses (UNODC, n.d.(a)).

## Content of the Web Site for the Hotline

A digital hotline can harness data processing power to provide a vast amount of information to anyone. Since a hotline sits on a Web server, the site where the informant first accesses the hotline, called the landing page, can be linked to many other Web sites that are devoted to fraud prevention and education.

A recommended best practice is that a landing page for a hotline should include the following:

- Purpose of the hotline and how it relates to the anti-corruption efforts of the sponsoring organization (SO).
- Instructions on how to file complaints.
- Reports on complaints received and their status (to the extent that it can be released to the public) without jeopardizing the investigation.
- Educational materials. There should be links to other Web sites that have information on ethics. Citizen responsibility to report frauds and links to individual hotlines of the inspector generals of the various government departments.
- Links to NGOs and civil-based societies that support and counsel whistle blowers.
- Results of cases that were investigated and links to information services that track court cases.

A model Web site for anti-corruption that has these features is the Hong Kong Independent Commission Against Corruption (ICAC) (n.d.), which incorporates hotline features with fraud prevention advocacy. The ICAC has had spectacular success over the last 30 years in becoming a model for clean government (UNODC, n.d.(c)).

## Web Site Content Promoting Transparency in Government

Strengthening the integrity and capacity of judges and prosecutors is another important goal of the UN Convention that is discussed in Article 11 (UNODC, n.d.(a)). A landing page should be linked to information about the fate of prosecutions adjudicated in courts of law and internal administrative actions taken by government. Publishing the outcomes of these cases tells everyone how well investigators, prosecutors, and judges perform their jobs.

Publishing the results of cases also reinforces the credibility of the hotline and the underlying fraud prevention effort. If a person is wavering about whether to report wrongdoing, throwing light on the entire process can reassure him or her that a personal sacrifice will make a difference.

## Support for Whistle Blowers

Before an informant reports a wrongdoing, he or she should understand that such an act may adversely impact his or her personal and professional life. Support resources for informants should be included on the landing page. Some NGO advisors help to evaluate the appropriateness of the acts that whistle blowers plan to expose and whether there is a more suitable remedy for something that actually may be an administrative grievance. In planning the Web site, government units should explore whether there are local NGOs that can provide this support.

Whistle blowers should have a voice on the landing page. But when is it appropriate for the whistle blower to report about what happens as a result of filing a complaint? Citizens are naturally curious about what happens to a complaint, and reports of outcomes lend more credibility to the hotline. Thorny issues, however, revolve around how the status of the whistle blower gets reported (if they chose to identify themselves), who should report it and when, and how to verify information reported by the whistle blower.

Informants should be warned that even if they wish to conceal their identities, it may be discovered during an investigation. Dire things may happen to informants and whistle blowers who are identified—they may lose their jobs; they may suffer severe economic consequences; or, if they remain employed, they may be reassigned to meaningless tasks. They also may become burdened with expensive legal bills. In one developed country, public servants have had their security clearances revoked, which means that they not only lose their jobs but also become blacklisted from any work that requires a security clearance (Devine, 2004).

In a developing country, where one or two companies dominate a sector of the economy, being stigmatized as a whistle blower can mean never working in that particular sector again. Subsequent employment obtained in a different sector may require that the person start over on a junior level in a new profession, which results in long-term loss of income (Dimba, Stober, & Thomson, 2004).

## Required Infrastructure for Telecommunications Within the Country

Digital hotlines require an effective telecommunications infrastructure in the country. One organization that brings information and communications technology to the poor is the United Nations Development Programme (UNDP). It has an extensive Web site of information and projects in this area, and governments should explore possible services that UNDP may be able to offer in the country.

## Requirements for a Successful Digital Hotline

Adequate financial and IT resources alone will not guarantee success, especially if there is a high volume of

complaints at startup. There has to be adequate capacity in order for both investigators and the internal justice system to handle an increased workload. Investigators, prosecutors, and judges or administrative tribunals have to complete cases promptly after they are initiated through the hotline. Long delays with inadequate and incomplete reports will quickly destroy the credibility of the hotline and the related anti-corruption effort (PcaW, n.d.).

## FUTURE TRENDS

Any public entity that is establishing a digital hotline should consider the following topics:

- Is the national infrastructure for telecommunications adequate to support widespread access to the digital hotline?
- What are the objectives for the hotline, based on national, state, or local needs?
- Who owns the hotline; who is the governing body, and what is its power?
- Who manages it on a day-to-day basis?
- Structure of the hotline—What are the client agencies and how can their hotlines be coordinated?
- Telephone operators—How important is it to have telephone operators who talk with informants, and when and how should those operators be used?
- Who are the users—Are reporters restricted only to citizens, to employees, to vendors, or to any person living in the country?
- Marketing the hotline—What kind of advertising campaign will encourage citizens to use the hotline?
- Support to whistle blowers—What support and advice should be given to informants in order to warn them about the risks of filing a complaint?
- Funding—What is the budget, and how will costs be apportioned among public entities that share a hotline?
- Reports from the hotline:
- What are the annual operating reports, and who will receive them?
- When can a complaint and its investigation be disclosed to the public?
- What reports should be disclosed to the public and when?
- Feedback to the informant—When and how should the SO give feedback?
- Evaluating Effectiveness—What are the indicators of success for the hotline by quality and quantity?

## CONCLUSION

A digital hotline is a vehicle for citizens to report fraud and abuse in the public sector and, with its related Web-based technology, serves as a platform to support a culture of zero tolerance toward corruption. A digital hotline can bolster the faith and confidence of the public that its government is committed to running clean operations without corruption. If citizens believe that they can make a difference and that they will be protected from acts of retaliation, they will blow the digital whistle that they are given, and they will blow it loudly.

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## KEY TERMS

**Complaint:** A statement by a person that there has been wrongdoing by one or more employees of an organization. It has to be investigated to determine if the information is true.

**Confidential Informant (CI):** Person who reports information about wrongdoing. This person does not want his or her identity revealed to the public.

**Corruption:** The misuse of entrusted power for private gain. (Downloaded from the TI Web site on December 4, 2005, from http://www.transparency.org/faqs/faq-corruption.html.)

**Hotline:** A system that facilitates the discovery of wrongdoing. It facilitates communications between an informant or a whistle blower and the sponsoring organization (SO), which investigates and prevents wrongdoing.

**Informant:** A person who discloses information about wrongdoing. This person may remain anonymous or can reveal his or her identity only to a select person within an entity, in which case this person becomes a confidential informant.

**Information Technology Governance Institute (ITGI):** Assists managers in fulfilling their responsibility to ensure that information technology is aligned with the business and delivers value efficiently and effectively (http://www.itgi.org).

**Non-Governmental Organization (NGO):** Serves the public interest. Its finances and management are independent of government.

**Public Interest Disclosure Act (PIDA):** A Part of employment law in the United Kingdom that defines what is a protected disclosure for wrongdoing. The law applies to all workers in the UK, whether they are employed in public, private, or voluntary sectors.

**Sponsoring Organization (SO):** Any entity involved in activities that has employees and volunteers and that hosts a hotline designed to receive complaints of abuse and corruption.

**Support Groups for Whistle Blowers and Confidential Informants:** Offer counseling and legal assistance to whistle blowers.

**Transparency International (TI):** An NGO that brings civil society, business, and governments together in a powerful global coalition in order to combat corruption (http://www.transparency.org/).

**United Nations Development Programme (UNDP):** The United Nations global development network. UNDP helps countries to attract and use development aid effectively (http://www.undp.org). UNDP is active in information and communication technologies for development and has a wealth of information from a network of 166 countries in which it works (http://sdnhq.undp.org/it4dev). UNDP also supports e-governance and citizen participation in government through access to information (http://www.undp.org/governance/sl-egov.htm)

**United Nations Office on Drug and Crime Control (UNODC):** A United Nations organization that supports the Global Programme against Corruption, Vienna International Centre, P.O. Box 500, Room E1272, A-1400 Vienna, Austria. Tel: +43(1) 26060-4406; Fax: +43(1) 26060-5898.

**United States General Accounting Office (GAO):** Supports the Congress of the United States to improve the performance and to ensure the accountability of the federal government for the benefit of the American people (www.gao.gov).

**Whistle Blower:** An employee who discloses an abuse of power that betrays the public trust.

**Whistle Blowing:** The act of an employee who voices concerns about wrongdoing in the workplace or through an independent entity associated with it. Whistle blowers do not conceal their identities and often communicate their concerns to supervisors, managers, executives, regulators, or the public (Calland & Dehn, 2004).

**Wrongdoing:** Any action by an employee that does not comply with the code of conduct, applicable laws, rules, regulations, or operational guidelines of the employing organization or that violates the laws of the country. Besides illegal acts, wrongdoing includes waste, mismanagement, abuse of authority, or posing a substantial and specific danger to public health and safety (Devine, 2004).

# Virtual Innovation Environment



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## INTRODUCTION

Major new trends of our era emerge from the spread of information society and the increasing role of innovation as source of competitive advantage, development, and wealth. Innovation, however, is a tricky issue. We do not dispose adequate theories for predicting innovation in different sectors of industry and services, though we have plenty of tools and methods which assist and facilitate innovation in product development, process reorganization, and quality improvement. We tend to compensate the lack of theory about radical innovation (none can tell what the next big thing will be in an industry sector) with environments of innovation enabling the use of tools, instruments, and methods: financial tools, institutional tools, communication and information tools, creativity tools, and others.

The rise of the information society opened new possibilities in the creation of environments of innovation. Digital tools and virtual (digital) innovation environments may assist organizations in learning and practicing innovation. They offer new forms of government (digital this time), online or offline, for mastering the complex processes of technological development and innovation. These virtual environments are important for companies, research institutions, technology intermediary organizations, and the public administration involved in innovation and research and development (R&D) management as well.

## BACKGROUND: ENVIRONMENTS OF INNOVATION

Newer theories of innovation attribute an important role to the external environment of innovation embedded in networks and systems, communities, clusters, and regions, affecting the processes of innovation. Interactions within communities and regional or national innovation systems, combinations of roles and skills, communication channels, functional and spatial bonds bridging separate knowledge fields, are ingredients of participatory processes that result in new products and technologies (Cooke & Morgan, 1997).

Brokering theories assert that innovation derives from the synthesis of various fields of research and technology. Hargadon (2003) argues that innovation is a collaborative process in which knowledge and insights from different fields of science and technology are combined and create something new. A critical factor in achieving a new combination of unrelated knowledge is the human community in which different skills and competences are pooled together.

Nonaka and Tackeuchi (1995) describe innovation as tacit knowledge being transformed into explicit knowledge. They place great emphasis on this transformation of knowledge and explain the enormous organizational effort which is needed for this conversion of atypical and personalized knowledge into explicit, modeled know-how, and engineering. Dealing with innovation and tacit knowledge, Morgan (2001) goes one step further arguing that tacit knowledge is embedded in individuals and organizational routines which have location-specific dimensions and tend to cluster. Tacit knowledge is spatially "sticky" and despite the growth of knowledge management tools, is not easily communicated other than through personal interaction. Clustering becomes inevitable in innovative practices, not from the viewpoint of minimizing transaction costs, but in order to materialize the innovative behavior.

Evolutionary theories also assert that innovation springs from externalities, knowledge asymmetries, market imperfections, and institutions that select and manage the flow of knowledge. Learning, both as acquisition and use of existing knowledge and creation of new knowledge, is the key process. A different cognitive space is created in each organization composed of nodes and networks. The external environment has a decisive role also. Nelson and Winters (1982) explain that genetic processes to innovation are regulated by a "selection environment" which switches on-off the flow between ideas and products. Nations and regions through systems of innovation provide this selection and regulatory environment, bridging knowledge, competences, and resources from different actors, and screening of ideas and technologies through competent or funding organizations (Nelson, 1993).

A common understanding has been achieved, which attributes a major role to the environment of innovation,

pointing out at an "open innovation" paradigm (Chesbrough, 2003) in which valuable ideas, knowledge, and skills come from outside the organization. Innovation is an "environmental condition" (Komninos, 2002); it is less an individual achievement than the joint effort of communities of people working together, interacting, and sharing common goals and visions.

## THE FUTURE: VIRTUAL ENVIRONMENT OF INNOVATION

Human ingenuity recently added a new dimension to the physical and institutional environments of innovation: a digital or virtual dimension. The rise of the information society and the Internet brought into existence various fora for digital gathering, communication, and interaction, which strengthen the contribution of agglomerations and communities to innovation processes (Table 1). Henceforth innovative environments are constituted by more complex combinations among physical, institutional, and digital spaces.

A series of IT applications, systems, and digital tools are used to create virtual environments. Most are based on conventional information technologies and Internet based communication platforms. The core of solutions is on knowledge management and guidance of the innovation process rather than sophisticated telecommunications; services and knowledge management tools predominate over bandwidth. Some major categories are the following.

- **Business and Regional Intelligence:** For every organization attempting to develop a new product, it is important to know how potential customers evaluate this product, what the expected customer behaviour trends are, what similar products already exist, what their features are, which companies produce them, at which prices, for which markets, and what opportunities spring from emerging technologies. Gathering, organizing and utilizing this information can be made both easier and can be supported by using cutting-edge IT tools and employing information available on the Internet (Pawar & Sharda, 1997). Applications developed for business and regional intelligence purposes seek to facilitate information management. Their architecture combines targeted information collection, processing tools, and information dissemination to the end user (Back, 2002)
- **Virtual Communities and Clusters:** Virtual communities play a role in innovation similar to physical communities in terms of communication, socialization, and learning (Henri & Pudelko, 2003). The usual way for a virtual community to be created is with respect to a network of people sharing the same ideas or objectives. Two situations are possible. A physical-virtual situation in which the virtual extends the cooperation bonds of a physical commu-

*Table 1. Components of virtual innovation environment*

| Objective | Type of function | Type of online tool |
|---|---|---|
| Information | Learn about | Web pages; e-learning; online libraries; online databases; portals; online newsletters; blogs; digital cities |
| | Search/find | Search engines; semantic Web tools |
| | Consulting | Online technology transfer; online R&D; virtual brokering; market and technology watch; observatories |
| Communication | Communication | Electronic mail; telepresence; alerts |
| | Discussion | Discussion forum; e-communities |
| | Make a demand; give an order | Electronic exchange; e-auctions; e-commerce; virtual clusters |
| Problem-solving | Knowledge processing | Online creativity tools; online mind tools |
| | Guide a process | Digital roadmaps; online innovation management tools |
| | Turn knowledge into product | Product innovation and design tools; virtual engineering; online survey tools; virtual customer applications |

nity. In this case, most practices of the community remain in the physical space, while part of the communication and learning is transferred to the digital space. Second, a virtual-virtual situation is one in which the virtual community exists independently from the geographical gathering of people, though the members of the virtual community may meet occasionally, communicate and cooperate in physical space. In this virtual-virtual situation, the social bond is weaker, as are the emergence of intention, and the creation of identity. Virtual communities also take the form of virtual clusters. In a virtual cluster, each enterprise adds value by exchanging knowledge with other members. Internet technologies allow for increased real-time interaction, e-learning, and technology transfer, which in turn are translated into improved products and services and a reduction in transaction costs, as well (Passiante & Secundo, 2002)

- **Online Innovation Tools:** This is probably the most important component in the virtual innovation environment and includes tools and applications for solving typical knowledge management and innovation development problems. These tools can be broken down into sub-groups depending on the internal problem-solving mechanism:
  1. Roadmap tools which lead the user to problem resolution step-by-step, for instance through the stages of new product development or a spin-off company creation
  2. Dedicated tools which may assist in specific problems (i.e., drafting a business plan, benchmarking the performance of an organization, undertaking a technology audit, which rely on an input-output structure, data input and automatic result generation)
  3. Learning tools which present a problem and an overview of the methods that could be used to solve it, best practice from the past, bibliographical references and documentation
- **Web-Based Promotion Platforms:** These applications support awareness-raising on products and services, marketing, advertising, and e-commerce. They are based on a combination of Web applications, databases, and multimedia. Major categories of promotion platforms are: (1) corporate Web sites, which promote a business or organization's products or services, (2) "department stores" which group services and products from numerous suppliers together, (3) government Web sites informing citizens about the services provided by the public administration, and (4) digital cities which promote a territorial entity together with its products and services. Digital cities offer an exceptionally important promotion platform, yet underutilized. Their architecture includes numerous layers: 2-D and 3-D images of the physical space of cities and regions, infrastructure and services, products organized into databases, navigation applications, online service markets, as well as user communication interfaces where information, images and applications are synthesized (Ishida, 2000).

## CONCLUSION

The central question about the virtual innovation environment relates to how it functions. The question is what does this environment have to offer to innovation processes? What innovation functions are made easier or accelerated in the digital space?

The key to these questions lies in understanding innovation as a collective knowledge process. Knowledge is at the very epicenter of innovation. This gives the digital space a tremendous power since its exclusive ability is to manage information and knowledge. Innovation processes taking place in digital spaces complement the creative processes that occur in physical and institutional spaces. Digital spaces are primarily instrumental spaces. They facilitate the extension of networks and learning, allowing organizations to be engaged in R&D and deploy their technology capabilities, while the use of digital tools and services is improving problem-solving capabilities and know-how in individuals and institutions.

The most direct impact of the digital environment on knowledge-innovation systems relates to learning processes that are transformed and bolstered by e-learning applications. E-learning may develop on different ontological levels, at individual, team, organization, inter-organization level, and from different perspectives as well, the cognitive perspective aiming to change the structures of the learning system, the cultural perspective dealing with human behavior, and the action perspective rooted in experimental learning (Passiante & Secundo, 2002). The true power of e-learning in the field of innovation is that it enables non-conventional knowledge processes to occur either between producers and customers or between producers, suppliers, and subcontractors.

A second field of impact relates to knowledge brokering networks. Within every innovation system there is a continuous exchange and transfer of knowledge going on. By far the greater part of this network activity relates to knowledge transfer and exchange. Knowledge is the most important connective substance in knowledge brokering networks, an intangible asset

which is "traded" through partnerships and collaboration. Via multi-level virtual networks the digital environment offers new options for exchanging knowledge and communicating in real time. Virtual networking applications, such as virtual customer, virtual cluster, virtual technology exchange, virtual order placing, virtual follow-up of processes, and so forth. have greatly amplified the ability of firms to exchange knowledge, cooperate and innovate. The Internet enables the creation of multiple virtual environments and platforms for collaboration allowing firms to tap into customer and supplier knowledge through virtual knowledge brokering (Verona, Prandelli, & Sawhney, 2003).

A third field which is dramatically affected by virtual spaces relates to human resource skills. The development of digital tools and online problem solving applications is an amazing achievement. Online tools allow even the most remote worker to significantly improve his/her skills and problem solving capabilities, and within a short period of time to acquire skills disproportionate to the time he or she invested in learning them. Online tools differ from e-learning applications since they are more targeted, but primarily because they help in solving a problem without requiring detailed understanding of it. As is the case with all tools, their use does not involve understanding of how they operate. Offline/online problem solving tools are available for all types of innovation, but primarily for market and technology watch, technology transfer, new product development, and optimization of supply chains.

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## KEY TERMS

**Cluster:** Network of production of interdependent companies, knowledge-producing agents, and intermediary funding and consulting organizations.

**Digital Cities:** A platform of digital community networks and information spaces using the city metaphor to exchange information and communicate.

**E-Learning:** Delivery via the Web of individualized, dynamic, and digital learning content, aiding knowledge

transfer and recombination within communities of knowledge and innovation.

**Innovation:** The act of starting something for the first time; introducing something new; the creation of a new device or process resulting from study and experimentation. A typical division is between product, process, and organization innovations. *Product innovation* is linked to the improvement or renewal of products being phased out; *process innovations* relate to the use of more advanced production technologies; *organizational innovations* introduce more efficient cost arrangement by reorganizing the entire supply chain and producer-supplier relations.

**Systems of Innovation:** Technological innovation advances through the interaction of multiple actors, between component and system producers, universities and industries, technology transfer organizations and brokers, venture capital and government funding institutions, which form national or regional networks, communities, and systems.

**Virtual Clusters:** Systems of suppliers, distributors, service providers, and clients that use internetworking technologies as the principal way of cooperating and competing.

**Virtual Communities:** A network of people assembled around a topic of common interest, or goal communicating over the Internet.

# Virtual Policy Networks

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## INTRODUCTION

As information cascades across the Internet and human communication patterns are transposed into computer-mediated environments, governments around the globe race to garner the benefits of ICTs and Web-based communications (Bannister & Walsh, 2002; Chadwick & May, 2002; Falch & Henten, 2000; Heeks, 2002; Ma, Chung, & Thorsona, 2005). Increasingly sophisticated user-citizens can now access numerous electronic services, collect policy-relevant information, and communicate with governments through electronic channels (Dahlberg, 2001; Lenk, 2003). Contemporary e-government, while variable across states, has evolved significantly in the last decade, pursing increasing transparency and accountability through the implementation of various e-government measures (Jaeger & Thompson, 2003; Reddick, 2005). While theoretical contentions concerning the authenticity of e-democracy have yet to abate, collections of policy actors that seek entrance and participation in the public policy process have also emerged online (Chadwick & May, 2002; Della Porta & Mosca, 2005; Klein, 2002). This article considers these online policy communities.

## BACKGROUND

### The Networked Polity

As government's increasingly look to outside sources for information, effectiveness, and legitimacy, virtual policy networks provide an ideal avenue for engaging citizens in the participation and consultation processes associated with policy decision-making (Hajer & Wagenaar, 2003; Roch, Scholz, & McGraw, 2000). Virtual policy networks are online collectives that seek to influence the policy process through the use of information and communication technologies. These networks represent the contemporary coalescence of technological and social organization, and are inscribed with key insights into human behaviour. Applying network theory to virtual policy communities provides a powerful analytical lens to study online constellations of policy actors.

Employing network analysis to understand the organization of governance, public management and policy communities is a well-established approach in the policy sciences (Carlsson, 2000; Klijn & Koppenjan, 2000; Mattila, 2003; Montpetit, 2003). The network approach is a particularly attractive conceptual option for identifying the various interactions between state and society, and for explaining variations across sectors, policy domains and states. Network theory addresses the complexities associated with new modes of governance and policy-making, recognizing the importance of categorizing actors and institutions into certain groups of policy-relevant interactions. The increasing reliance on ICTs in politics and policy-making, supports and advances the growth of network participation (Mutch, 2002). As Donald Kettl (2002) observes "networks have provided a framework for understanding the growing connection between various organizations that find themselves working together to implement public policy" (p. 112). ICTs have become crucial policy tools expanding national forums through extended online participation opportunities, altering both the policy process and the core relationship between the citizenry and governing bodies Chadwick (2003).

A network approach also provides important insights into modern governance and the complexity of contemporary policy processes. Governments today must be extremely consciousness of network dynamics and how to best manage the multitude of interests vying for particular policy outcomes. As an applied approach network analysis offers an appreciation of the challenges faced by modern government, and the variable processes conditioning the political landscape including the impact of ICTs, global policy initiatives, the burgeoning number of policy actors, and the increasingly interdependent and decentralized relations in and among states.

The state's accommodation of these interests requires overlapping networks of governance that provide policy space in which business, civic networks, and governments co-exit and collaborate to resolve policy challenges (Lowndes & Skelcher, 1998). Throughout this process network, coordination has become critical and thus one of the primary challenges for public administration and contemporary policy actors is to devise strategies that operate effectively in globalized and decentralized policy spheres. Although traditional hierarchal state's with top-down governance tendency will inevitably continue to characterize Western nations, the demands of the

networked polity oblige states to effectively adapt to the "horizontal networks that have been layered on top of the traditional vertical system" (Kettl, 2000, p. 495).

## VIRTUAL POLICY NETWORKS

### Policy Communities Online

Policy network scholars advance two primary assumptions concerning social behaviour. The first assumption contends that actors' social systems typically include a myriad of other actors, and that the interactions among these actors will significantly effect the decisions of both the group and the individuals embedded within the group (Carlsson, 2000; Hamm, 1995; Kilduff & Tsai, 2003). The second core conjecture of network theory assumes that structure matters, and that particular actors within the network will enjoy "regularities" in their patterns of interaction (Howlett, 2002). Thus, policy network analysis recognizes "that policy is made in complex interaction processes between large numbers of actors, which takes place within networks of interdependent actors ... co-operation, however, is by no means simple or spontaneous, and it requires types of game management and network constitution" (Klijn & Koppenjan, 2000, p. 139).

Online communities have also garnered extensive attention from academic researchers seeking to understand online behaviour and distill the social aspects of this technology from the more utilitarian uses (Wellman, 2001). Current research shows that online clusters tend to gravitate towards topical interest activities premised on identity, politics, social knowledge, entertainment, gaming, commerce and crime (Della Porta & Mosca, 2005; Döring, 2002; Matzat, 2002). While Internet-mediated identity and personas are malleable online, Web-based communication patterns are closely tethered to traditional social organization (Watts, 2003). Current empirical findings have already borne out the existence of online network communities that attract membership on the basis of political interest articulation and democratic engagement (Jeffery & Mayman, 2001; Mansell & Steinmueller, 2000), which is combined with significant increases in both the number of individuals using the Internet as a resource for political information, and the entry of new users engaged in online political activity (Bakardjieva, 2003; Mowbray, 2001). Combining the recently determined global properties of the Web with policy network theory allows for the discovery of virtual policy networks (Gibson, Kleinberg, & Raghavan, 1998).

### Human Shadows in the Web

The Web is a massive network with a typological structure determined by the arrangement in which the nodes of the network are connected to each other. The Web is comprised of approximately 1.5 billion pages, which are connected through hyperlink text. Hyperlinks, the glue that holds the network together, provide critical network information as connections record the direction of information flows and identify strong interconnections among particular actors. The technique used in the VPN discovery process is referred to as link-structure analysis and captures data using the latent human information embedded in Web pages and hyperlinks (Woo, 2003). For instance, hosts will publish various topical pages that provide links to alternative sources on the same subject. Among government organizations, corporations, NGOs and policy institutes, there has been a strong tendency to publish various partnership/membership lists that contain critical information concerning dominant actors of various policy communities. These processes of social organization and Web-based communication patterns leave what has been described by Farrall and Delli Carpini (2004) as "shadows in the Web graph." These technological imprints provide observable patterns of change, coalition building, and information flows, which are organized in networked environments and stamped on the sub-graph of the Web.

Using mathematics, graph theory, physics, computer science, engineering, and the new science of networks, several global properties of online communities have been identified including strong regularities among information gathering methods, hyperlink attachment, and structural traits characterized by the collective dynamics of the small world phenomena (Watts, 2003). Albert-László Barabási (2002), the first academic to map the Web, discovered that online networks are clustered, following a power law as opposed to the original assumption that they were uniform and followed a bell curve. In the case of random networks, a bell curve distribution results from the various nodes having similar probabilities of connecting with new nodes. Alternatively, in a scale free network, new nodes entering the system have a far greater probability of linking to the most connected nodes in the network, and as such, the distribution of nodes results in a concentration of links.

The application of small world networks to the structure of online communities is associated with the popular theory of six degrees of separation, which measures the structural properties of the network through path lengths (the average separation between two vertices within the network). In the case of the Web the degrees of separation, the average number of mouse clicks it take to locate

a specific document, is nineteen; however, within an online community members are typically only one or two mouse clicks away from the desired destination (Barabási, 2002). The empirical evidence garnered from the examination of these overall system laws and organizational characteristics of the Web provides us with the structural features of virtual policy networks. Using the known typological structures we may identify social networks that have emerged online and begin to focus more exclusively on the specific characteristics of individual networks (Borodin, Rosenthal, Roberts, & Tsaparas, 2001; Wu, Chen, & Sun, 2004).

## Navigating Virtual Policy Networks

The connectivity of each node (or Web site) determines both its classification and relationship to the other nodes. Using the linked structure of the Web, virtual policy networks are determined through resource lists of information documents that direct online communities towards particular information authorities (Lempel & Moran, 2000). The organizational structures of VPNs tend to mimic their real world counterparts, which suggests that the structural configuration of the network will condition policy dynamics and propensity towards change. Using two primary variables to determine network structure (symmetry and core insulation from exogenous forces) four specific ideal type virtual policy networks appear to be visible on the Web: broadcasting, regulation, circulation, and discursive.

The first type of network is protected from outside influences, controls flows of information and is resistant to the entrance of new actors. These networks simply broadcast dominate policy discourses seeking to maintain the status quo. The broadcasting VPN may be correlated with real world policy communities that are characterized as closed, with high levels of insulation from exogenous forces (Howlett, 2002). The second types of network is a circulation VPN which tends to be open to alternative policy information and competing ideas, yet impedes new membership attachment. The third ideal type of VPN is a regulation network which features limited information flow and higher levels of permeability. In these resistant networks policy leads politics with discourses characterized by core policy beliefs and porous memberships. Finally discursive virtual policy networks have more porous structures and are exposed to a constant influx of new actors and ideas. Discursive networks are by far the most democratically organized virtual policy networks, and are currently rare.

## FUTURE TRENDS

Virtual policy networks are durable patterns of online relations among a constellation of Web-based communications, with flows of information congregating around a specific policy field issue, event, institutions, or coalition. The emergence of virtual policy networks is one of the initial responses to e-government strategies. The advent and proliferation of ICTs has fundamentally altered how industrialized states are organized and the governing mechanisms employed to manage the relationship between state and society. Governments around the globe are aggressively pursuing e-government stratagems, seeking to facilitate political development through online venues. The changing relationship between state and society, and the emergence of virtual policy networks seeking to influence policy outcomes through Internet-mediated technology represents the opening up of new democratic spaces in which citizens and groups are able to organize politically.

Erik-Hans Klijn and Joop F. M. Koppenjan (2000) define policy networks as "(more or less) stable patterns of social relations between interdependent actors, which take shape around the policy problems and/or policy programmes" (p. 155). Research has established that the patterns described by Klijn and Koppenjan are occurring in an Internet-mediated environment (Bennett, 2003; Deibert, 2002). Various scholars have conducted studies on the structural features of the Web, measuring connectivity among nodes (Barabási, 2002), seeking relational context through Web pages links (Van Aelst, 2002), and undertaking in-depth analysis of particular communities' priorities using data mining techniques (Murnion & Healey, 1998). Similarly, policy scholars have determined that policy communities, and the outcomes these collectivities of policy actors are able to achieve is influenced by state involvement in networks, the social structures that characterize the networked relationships among the state and private organizations, and the network's receptiveness to new ideas and actors (Hajer & Wagenaar, 2003; Howlett, 2002; Montpetit, 2002, 2003).

## CONCLUSION

Virtual policy networks are durable patterns of online relations among a constellation of Web-based communications, with flows of information congregating around a specific policy field issue, event, institutions, or coalition. Existing policy literature suggest that various actors may participate in virtual policy networks, however such participation will be influenced by the sectoral organizational of a given policy domain, the national political system, institutional legacies, structural discourses, modes of governance, and the degree of e-government institutionalization.

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## KEY TERMS

**Broadcasting VPNs:** Virtual policy networks that are closed online communities with high levels of insulation from exogenous forces

**Circulation VPNs:** Virtual policy networks that welcome competing information flows and alternative policy discourses, yet remain insulated from fluid membership.

**Discursive VPNs:** Promote democratic participation through open membership and competing flows of information.

**Hyperlink Analysis:** A methodology used to study Web-based communication

**Networks:** Dynamic systems in which membership, connectivity, and growth are fluid and complex.

**Policy Community:** Refers to groups of actors that are organized around substantive policy issues and that seeks to influence the outcomes of policy decisions.

**Regulation VPNs:** Feature limited policy discourse and dominant network norms, yet are characterized by less-limited memberships attachment.

**Virtual Policy Networks:** Durable patterns of online relations among a constellation of Web-based communications, with flows of information congregating around a specific policy field, issue, event, institutions, or coalition.

# The Virtual Town Hall

V

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## INTRODUCTION

A key part of the appeal of interactive communications technology (ICT) has been its huge potential to facilitate citizen access to and participation in government and the political process, particularly since the advent of the World Wide Web (WWW) in the early 1990s. The ability of citizens to initiate direct contact with government individually and become civically engaged can be enhanced by telecommunications, according to e-democracy proponents (see Barber, 1984, 2003; Becker & Slaton, 2000; Cleveland, 1985; Clift, 2004; Davis, Elin, & Reeher, 2002; Nye, 1998). We refer to this use of ICT to enhance democracy as the virtual town hall (VTH). When we use the term "virtual town hall," we refer not only to specific current or prior use of ICT as a site for interactive public discourse but also to the full range of potential civic discourses that might be mediated through and enhanced by ICT (e.g., electronic town meetings, citizen juries, e-panels, and online polling, to name just a few). In short, the VTH concept encompasses all the ways in which contemporary and future interactive technologies can potentially create a "virtual public sphere," returning to "mass culture" some of the interactive and direct discourse practices of the traditional, local civic environment. We believe that such technologies have the potential, when developed and implemented properly, to enhance participatory government in any areas where broad-based access can be achieved. Likewise, this potential should encourage us to pursue the goal of increasing access to ICT for people everywhere, regarding it as a fundamental public service, like a basic utility, that constitutes a major factor in maintaining the quality of life. Governments in the United States and elsewhere have created a strong presence on the WWW since the mid- to late-1990s. However, government Web sites typically emphasize what has been called a "services first, democracy later approach," especially in the United States (Clift, 2003). The use of ICT to enhance citizen engagement with government and politics is often overlooked, downplayed, or ignored by governments in favor of the technology's capacity to help facilitate the delivery of public services.

Technology provides numerous opportunities for a more open, democratic process of governance and increased political participation. In theory, ICT makes this possible for the following reasons identified by Abramson, Atherton, and Orren (1988): the huge volume of information that can be exchanged; the ability to exchange this information without being constrained by time and space; the unprecedented control users have over what messages are received and when; the decentralization of information production and control; and the interactive nature of information exchange. Thus, the VTH can bring into being an online version of the public sphere, empowering ordinary citizens to strengthen their communities and democratic institutions (Cropf & Casaregola, 1998). The VTH uses ICT to encourage public discussion and deliberation over the proper ends of government and the means to achieve those ends. We contend the VTH can serve as a means to strengthen civil society. As noted by Putnam and others, civil society is essential to democracy. Civil society helps inculcate the core values and norms associated with democratic government. Indeed, according to Alexis de Tocqueville, civil society is what makes democratic government possible. Whether the potential of the VTH to strengthen civil society is fulfilled, however, depends on the current choices made by governments and other social institutions regarding issues of citizen access to ICT and the role of this technology in democratic governance.

## BACKGROUND: THE VIRTUAL TOWN HALL, E-DEMOCRACY, AND CIVIL SOCIETY

In general, governments' online efforts are well meaning and often effective in their own way, however, many fall short of facilitating genuine civic engagement by citizens. Fortunately, a great deal of effort has been exerted by grassroots, non-governmental organizations in creating citizen forums, which has helped fill the gap in online civic engagement. Public deliberation and decision-making is being facilitated by the use of ICT, whether the forums are

"officially" sponsored or not. The VTH is a critical element in the establishment of electronic democracy (e-democracy). According to social activist, Steven Clift (2004), "e-democracy represents the use of information and communication technologies and strategies by democratic actors (government officials, the media, political organizations, citizens/voters) within political and governance processes of local communities, nations and on the international stage" (p. 38). The advent of e-democracy has been touted since the early years of the personal computer revolution when, for example, one observer noted, "very large numbers of people empowered by knowledge … assert the right or feel the obligation to make policy" (Cleveland, 1985, p. 188). As more and more people respond to world events by participating, organizing, and deliberating online, the potential for using ICT to shape public policy is becoming more of a reality. Indeed, this is occurring on a global scale as civic groups and activists around the world seek to influence international policy-making via telecommunications (O'Brien, 2002). Fortunately, the experience in several countries (e.g., Canada, UK, and Australia) provides a source of optimism regarding technology's potential to strengthen democratic institutions and processes. Over time, however, elected leaders in all countries must use ICT to engage the public or larger numbers of people will feel alienated from government and view the political process as unresponsive to their needs.

The nexus of civil society, e-democracy, and e-government has been explored by authors such as Robert Putnam (2000) and Benjamin Barber (1984, 2003). For example, Putnam, although skeptical of the more grandiose claims of e-democracy proponents, concedes that telecommunications constitutes the most important trend toward strengthening civic engagement (p. 166). According to Barber (2003), vigorous public discussion and debate, which he refers to as "strong democratic talk," constitutes the very core of strong democratic communities. Advances in technology, Barber argues, provide the means for reducing the opportunity costs of citizen participation in democratic forums. Prior to the telecommunications revolution, participation was constrained for many citizens because of the costs incurred in taking time away from working, socializing with friends and families, or being engaged in leisure activities.

## VIRTUAL TOWN HALLS: A LITERATURE SURVEY

The scholarly literature suggests that new media technologies, particularly those found on the WWW, can be used to build civil society (Beamish, 1995; Cisler, 1993; Cropf & Casaregola, 1998; Fountain, 2001; Hale, Musso, & Weare, 1999; Levine, 2000; O'Brien, 2002; Putnam, 2000; Schuler, 1996). For example, communities using ICT can help the social integration of marginalized individuals by improving their access to other marginalized groups like themselves (Law & Keltner, 1995). Based on interviews with disabled or older users of community networks, the authors found that the marginalized users' social isolation was significantly reduced by their being able to communicate electronically with others facing similar challenges. Increasing and augmenting information sharing among people is an important foundation of social capital. By providing increased opportunities for communication among members of a community or across communities, one also increases the overall level of social trust, which can eventually be translated into collective action directed towards achieving common social goals (Kavanaugh & Patterson, 2001). This increased action can be directed toward achieving community goals and contributes significantly to an improvement in the community's overall quality of life. In a study of a community technology center, the authors found that building social capital was the critical ingredient in promoting positive change in the community (Alkalimat & Williams, 2001).

Technology can aid in creating connections between different communities, according to a study examining a series of community-based Web exhibits of the experiences of different ethnic groups in the American Southwest (Glogoff, 2001). This work reinforces the point made earlier that information sharing via ICT can help build social capital. According to the writer, the Web exhibits bring together

*[P]eople who self-identify with its content and seek out some degree of membership. Such behavior is consistent with the view that an essential element of building a climate of trust involves feeling secure in revealing vulnerable parts of ourselves to others. When people share intimate details of their lives with a* virtual *stranger, it affirms that an implicit context of trust has been established.*

The author's personal communications with exhibit visitors indicates that they believed the exhibit offered them a safe environment within which to open themselves up to others.

A recent article examines the effects on social capital of a resident-maintained "networked community" in Melbourne, Australia (Meredyth, Hopkins, Ewing, & Thomas, 2002). The Reach for the Clouds project is based in a low-income, ethnically diverse high-rise public housing development. The goal of the project, according to its sponsors, is to help residents to help themselves through

the use of network technology. The thinking behind the project was that if the tenants could learn and teach each other basic technology skills (for example, e-mail and instant messaging), they would be able to improve their community's safety by reducing the residents' sense of social isolation. Furthermore, these skills could assist tenants in increasing their employment opportunities. In this way, sponsors believed, the community network would be able to strengthen the community's social cohesion. The residents of the development, who are members of many different ethnic groups—the tenants speak at least 36 different languages—lack a sense of common identity. The sense of belonging and social connections exists within the language and ethnic groups instead of within the development. As a result of the increased access to technology there has been an augmentation of bonding capital but, at least to date, this has not had the desired effect of increasing bridging capital. The authors point out, however, that the experiment is still in its early stages. In a study of a middle-class suburban community in Toronto, Canada, the authors found that Internet usage bolsters social ties, regardless of whether they were strong or weak before (Hampton & Wellman, 1999).

Research on the effects of the WWW on social capital has identified three different approaches to computer networks and civil society (Quan-Haase & Wellman, 2002). First, the WWW can serve as a transformative agent. This comprises the literature asserting that the WWW can help bring about a dramatic increase in civic engagement. Second, the Web serves to diminish social capital. In other words, the WWW serves as a gigantic distraction drawing people away from family and community with its myriad entertainment and information opportunities. Third, the WWW serves as a supplement to social capital. Thus, instead of taking away from what people normally do, the Internet simply provides an alternative means to accomplish many of the same tasks and ends; for instance, in addition to talking on the telephone, people are sending each other e-mail and instant messages. The authors analyze data from a survey of 20,075 adult Internet users, along with results from similar surveys by other researchers. They find that, in general, the Internet adds to users' interactions via other means of communication. Thus, while face-to-face and telephone contact continue they are increasingly complemented by the ease of the Web in linking geographically dispersed individuals and groups that share common interests.

The importance of the literature cited above is that it shows the role of ICT in facilitating civic engagement and building social capital. This is accomplished through the forging of virtual connections between and within communities, as well as through the inclusion of marginalized individuals and groups in society. As a consequence of this strengthening of civil society, the political process, and other democratic institutions are also strengthened.

## EXAMPLES OF VIRTUAL TOWN HALLS

The use of ICT to enhance civic engagement has virtually exploded across the globe over the past decade. Consequently, no brief article could possibly do adequate justice to the variety of VTH experiments that exist around the world. For purpose of illustration and elucidation, we chose only five notable international examples, while recognizing that for every example chosen, literally dozens more could have been included.

1. **Almere, the Netherlands:** Citizens in Almere were invited to participate in the "co-production of interactive policy" involving the redevelopment of part of the city in 1999 (Poland, 2001). Information on the redevelopment projects was made available on the municipal Web site and a "consensus meter" was used to allow residents to select from over 200 possible projects.
2. **Houston, USA:** In 1994, thousands of Houston residents participated in an electronic town meeting to review proposals for the future of the city. Citizens gathered at five neighborhood meeting sites around the city and were linked via a satellite with a studio panel that was broadcast live on local television. The participants ranked fifty future goals for Houston that had been previously developed by citizen task forces (Teledemocracy Action News and Projects).
3. **Kalix, Sweden:** The municipal government has operated an "online town hall" (http://www.kalix.se, http://www.votia.com/kalix.demo) since September 2000. This forum provides an opportunity for citizens to chat with local political leaders and policymakers as well as to vote electronically on some issues. In September 2000, the citizens were given the opportunity to make suggestions regarding the redesign of the city center, to which the city residents responded with great enthusiasm. As a result, the city center was rebuilt taking the inhabitants' input into account.
4. **New York City, USA:** In 2002, America Speaks, Inc (http://www.americaspeaks.org/), a consulting group specializing in facilitating electronic town meetings, was asked to develop a project that would "help shape a vision for the rebuilding process" for downtown Manhattan following the Sep-

tember 11, 2001 terrorist attacks on the World Trade Center. Two town hall meetings were held, including one involving over 4,000 participants, and a two-week online dialogue that attracted another 800 participants provided valuable input to the disaster site's redevelopment process. The final report can be accessed at the America Speaks Web site (http://www.americaspeaks.org/resources/library/as/project_files/ltc/final_report_ltc2.pdf).

5. **Perth, Australia:** The Dialogue with the City project (http://www.dpi.wa.gov.au/dialogue/finalproc.pdf) was launched in 2003 by the state government to engage residents of Perth in a deliberation over the future course of the city. The stated goal of the project was to create a common vision of the city that would make it "the world's most livable city" by 2030. A Web site and an online discussion group was established as part of the project. The project culminated in a Dialogue with the City forum on September 13, 2003 involving over 1,000 participants and using computer technology to facilitate group discussion among the individuals in the assembly.

## FUTURE TRENDS

The wave of the future only a decade ago, e-democracy, is a growing reality in many parts of the globe today. A major factor in this trend is the existence of VTH as forums for online deliberation and building social capital. As technology continues to advance and costs decline, access and availability issues begin to fade in significance, allowing even the less affluent members of society to become computer users, at least in the most advanced industrial nations. As access becomes less problematic for most citizens, the number of virtual town halls can be expected to increase as well as their capacity to help shape public policy. Indeed, people's expectations regarding technology and political empowerment will continue to grow, as Cleveland (1985) predicted early in the current information age. The question is whether governments will keep pace with these growing expectations or whether they will resist popular demands for more influence in decision-making.

## CONCLUSION

The current use of ICT by governments sometimes evokes the image of a vast public sector version of Amazon.com. In other words, government Web sites provide a more efficient and cost-effective means to provide public services they have previously delivered or offered to citizens (for example, renewing a driver's license, paying a tax bill, obtaining their children's grades, etc.). While there is much to be said for this idea, scholars and civic activists believe that technology is capable of much more in the area of strengthening civic engagement and the democratic process. Utilizing technology simply to facilitate the delivery of services fails to take advantage of a key characteristic of ICT; namely, its democratizing tendencies, chief among which is the capability of bringing together large numbers of people online to deliberate and voice their opinions regarding issues. In this respect, the VTH takes advantage of ICT's potential for democratic deliberation because of the non-hierarchical, many-to-many mode of information sharing and creation.

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## KEY TERMS

**Bonding Capital:** Social networks or ties that connect people to other people like themselves; tends to be exclusive of outsiders.

**Bridging Capital:** Social networks or ties that connect people to other people unlike themselves; tends to be more inclusive.

**Citizen Juries:** Groups of people, broadly representative of their communities, who are chosen to deliberate on an issue of importance to the community from which they are selected. These deliberations are usually facilitated so that each participant becomes fully engaged in the process and a consensus arrived at. At the completion of the process, the findings of the group are reported to the community for follow-up and action.

**Civic Engagement:** The process by which citizens participate in civil society and seek to influence the political process.

**Civil Society:** The domain of social life independent of the government and private markets, consisting of voluntary associations.

**E-Democracy:** The use of interactive communications technology by governments, elected representatives, civic groups, political organizations, and private citizens to

influence the political process and governmental institutions via means that can include online discussion groups, government Web sites facilitating consultation between citizens and their government, and other form of online civic participation and engagement.

**E-Government:** The use of technology to facilitate administration of government, to improve citizen access to government information and services, and to encourage civic participation in the political process.

**Electronic Town Meeting:** A process which usually involves each of the following three components: (1) the use of media technologies to present information on political issues to participants, (2) discussion and deliberation, typically via media technologies and ICT, and (3) the gathering of information and feedback, usually through a sample survey of the citizens in a given area.

**Networked Community:** Using computers to bring people together in a community setting in order to empower local residents.

**Social Capital:** Such mechanisms as networks, shared trust, norms and values that allows a society to cooperate or collaborate in order to achieve its collective goals. The sum of the institutions, relationships, and norms in a society that shape the quality and quantity of its social interactions.

# Voice Technologies in the Public Sector for E-Government Services

V

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## INTRODUCTION

Spurred by the development of new Extensible Markup Language (XML)-based telephony markup languages and the adoption of requirements for universal access to government Internet content (CITA, 2005), more and more governments are making use of a new family of open-standard development languages to make their visual Web applications accessible by telephones and cell phones. This article will explore the development of the factors driving this trend, and explore possible future trends as these new technologies mature.

## BACKGROUND

Early in the development of the Internet as a tool for governments to provide information and services to citizens, researchers recognized the fundamental dilemma of e-government service delivery; access to the Internet and the ability to utilize Web browsers and Web-based services is unevenly spread (Novak, 1998). In the United States (U.S.), researchers identified several key factors that help explain access to Internet technology generally and to Internet-connected computers specifically. Income and other factors unevenly spread throughout the population can influence access to the Internet (NTIA, 1999). Additionally, researchers have identified age as a key factor determining ability to access Internet resources (Fox, 2004). These factors can present significant issues for governments, which operate under a universal service delivery mandate.

At approximately the same time during the 1990s that the Internet began to be used by more and more governments, researchers at AT&T/Bell Laboratories began work on a project to develop a phone markup language to support telephone access to Internet content. Researchers at AT&T, Lucent (following the company's separation from AT&T) and Motorola continued to pursue the development of a telephony markup language and incorporated the framework of XML, which became a formal standard in 1998 (W3C, 2002). The work conducted by these organizations on phone markup languages was eventually submitted to the World Wide Web Consortium (W3C) for consideration as a formal Web standard, and the Voice Extensible Markup Language (VoiceXML) Forum was created to advance the use of voice markup languages.

These efforts resulted in the development of VoiceXML. In simplest terms, VoiceXML is a Web technology that turns any telephone, even a rotary phone, into an Internet device. VoiceXML is a non-proprietary, Web-based markup language for creating vocal dialogs between humans and computers. VoiceXML is similar to another common markup language—Hypertext Markup Language (HTML), the basic language of most visual Web pages.

## EVOLUTION OF THE VOICE WEB

Just as a Web browser renders HTML documents visually for display on a computer monitor, a VoiceXML interpreter renders VoiceXML documents for vocal representation (W3C, 2004). In this respect, one can think of a VoiceXML interpreter as a telephone-based voice browser. As with HTML documents, VoiceXML documents have

*Figure 1. An HTML Web page*

```
<html>
<head>
<title>NIST.gov</title>
</head>
<body>
<h1>Welcome!</h1>
<h2>
This is the National Institute of
Standards and Technology.
</h2>
<p> NIST is a non-regulatory federal
agency within the U.S. Commerce
Department's Technology
Administration.
</p>
</body>
</html>
```

*Figure 2. A VoiceXML dialog*

```
<vxml>
 <form id="welcome">
 <block>

<prompt>
Welcome!
<break size="medium"/>
This is the National Institute of
Standards and Technology.
NIST is a non-regulatory federal agency
within the U.S. Commerce Department's
Technology Administration.
</prompt>

 </block>
 </form>
 </vxml>
```

uniform resource identifiers (URIs) and can be located on any traditional Web server. However, instead of pointing a client-side Web browser at a specific URI, citizens can access a VoiceXML application by calling a telephone number from any ordinary telephone—cellular or traditional, touch-tone or rotary.

VoiceXML belongs to a family of open Web standards referred to collectively as the speech interface framework (SIF). The underlying communications protocol used by VoiceXML and the SIF is the hypertext transfer protocol (HTTP), the same basic communications format used by visual Internet applications (Rehor, 2001).

## BENEFITS OF THE VOICE WEB FOR GOVERNMENT SERVICES DELIVERY

Governments exist to provide services and information to constituents regardless of race, gender, socio-economic status or other factors. However, many governments continue to struggle with Internet access issues and ways to provide e-government services to different groups of citizens. For example, research on the ability of different groups in the U.S. to access the Internet shows clear differences between whites and other groups of citizens, with whites being more likely to have access than other groups (Novak, 1998).

There are also differences in rate of use of the Internet among older citizens as opposed to younger ones. Only about 22% of seniors in the U.S. report being able to access the Internet (Fox, 2004), and research suggests that this group faces unique barriers to traditional Internet access because of the more likely incidence of factors like poor vision and other disabilities. Research from other countries suggests a similar trend outside the U.S. (Paul, 2005). VoiceXML may be a useful technology to help address the challenges that face certain populations in accessing Internet-based government content.

VoiceXML and technologies in the SIF can help make government Internet content and applications available through any traditional or cellular telephone. In some cases, VoiceXML content and applications (when coupled with widely available speech recognition technologies) can even be made available through rotary telephones. This has the effect of dramatically widening the audience for government Web content or services.

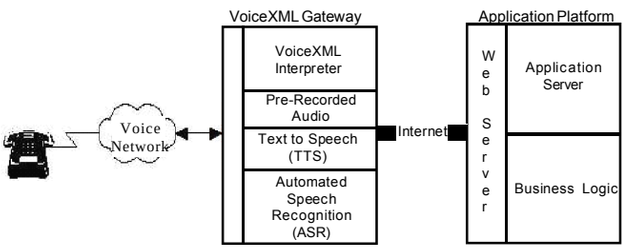
In addition, VoiceXML and the SIF can help governments address some of the most fundamental issues impacting the ability of citizens to access online government resources. Speech interfaces can be more natural than visual Web forms, particularly for those with visual disabilities or literacy issues. Additionally, the skills required to operate a telephone are more evenly spread than that of a computer or visual Web browser. In addition, while many governments still struggle to make their Internet content accessible to individuals with physical limitations, VoiceXML can enhance the accessibility of Web content and services to those with visual or other impairments.

VoiceXML can also provide a number of operational benefits for governments that make use of it as opposed to proprietary interactive voice response (IVR) technology. Because VoiceXML is a Web-based markup language, and since the vast majority of public-sector entities have infrastructures to support Web sites (West, 2004), governments can leverage existing knowledge in other markup languages like HTML to develop voice applications more quickly. Also, because the underlying

*Table 1. SIF components*

| Component | Purpose |
|---|---|
| VoiceXML | XML language for constructing dialogs with callers. |
| Speech Recognition Grammar Specification (SRGS) | XML language for specifying grammars that define allowed input to a speech application. |
| Speech Synthesis Markup Language (SSML) | XML language for specifying the rendering of synthesized (computer-generated) speech to a caller. |
| Call Control Extensible Markup Language (CCXML) | XML language for specifying call control functions, like call conferencing and session management. |

*Figure 3. Overview of a typical voice Web application*




communications protocol used by VoiceXML is the same used by visual Web applications, VoiceXML applications can use the same existing back-end business logic and legacy systems as their visual counterparts, enabling voice solutions to be efficiently introduced to government technology environments to help improve service delivery.

Distilled to its essence, the primary benefit of VoiceXML is that it extends the traditional Web development paradigm to the telephone. The same software and hardware components, the same communications protocols and the same development skill sets used to create and deploy visual Web content and applications all can be used to create voice applications.

## COMPONENTS OF A VOICEXML APPLICATION

Several key components make up a VoiceXML application (Rehor, 2001). Some of these components are identical to those found in traditional Web applications, and others fulfill the unique requirements of voice applications:

- **Application Platform:** This component typically includes a Web server and application server (it may optionally also include a database server). Business logic (i.e., the rules that govern how an application behaves) is executed by the application server and served to other components through the Web server.
- **VoiceXML Gateway:** This component includes a VoiceXML interpreter that acts as a client to the application platform. The interpreter can process VoiceXML dialogs and controls the recognition and generation of speech. It also interfaces with telephony resources.
- **Network:** This component includes a packet-based network that connects the application platform and the VoiceXML gateway. In the case of a hosted VoiceXML gateway (discussed below), the network may be the public Internet.
- **Voice Network:** Typically the Public Switched Telephone Network (PSTN), and any telephone that can connect to the telephone network.

Some of these components, most notably those making up the VoiceXML gateway, are unique to voice applications. While these components may require some specialized knowledge to manage, a large number of commercially available and open-source software components can be used (Rehor, 2005). It is possible to construct both the application platform and VoiceXML gateway entirely from open-source components if desired, obviating the need for most upfront software costs. As these software packages become more numerous, the knowledge required to manage them becomes more widely diffused.

As an alternative to managing the VoiceXML gateway component themselves, many governments are opting to outsource this function to third-party entities. A growing number of hosting providers are available to help deploy voice applications of all sizes (Jamison, 2004). This approach has the advantage of outsourcing the more esoteric portion of the application components and allowing governments to focus on those aspects with which they have the most experience.

### Challenges Facing Voice Delivery of Government Information

Despite the enormous promise that VoiceXML and related technologies show in helping governments address fundamental issues relating to access to Internet-based information and services, some challenges remain to their widespread use.

While speech may provide a more natural interface that helps overcome significant limitations in accessing written information (e.g., literacy), it is not an efficient interface for all government information or services. Voice interfaces are ideal for highly focused transactions and the exchange of succinct, highly valuable informa-

tion. Voice interfaces are not ideal for reviewing large documents, for open-ended dialogs with callers or for transactions requiring a fairly large number of multiple steps.

Additionally, VoiceXML lacks some of the more basic security mechanisms utilized in visual Web sites. For example, almost every modern Web browser will obscure password information entered into a Web-based form. This can help prevent the inadvertent disclosure of password information that may compromise users. Callers to a voice system may compromise sensitive information such as a password when it is spoken so that a VoiceXML application can recognize it. This may be mitigated somewhat by the use of touch-tone keypads, but it is generally recognized that more robust security features are needed to help foster the widespread deployment of VoiceXML applications.

Finally, there is currently poor support in the SIF for some languages (e.g., Asian languages). There are methods for developing VoiceXML applications that can mitigate this, but greater support for a wider array of languages is a critical next step in the development of VoiceXML.

In December 2005, the W3C announced plans to begin to address some of these limitations, including incorporating a technique called "speaker verification" into the next version of VoiceXML. Speaker verification provides an authentication mechanism based on a caller's voice print, or the unique characteristics of a caller's voice (W3C, 2005).

In addition, the organization has undertaken an effort to internationalize the SSML, which will allow VoiceXML applications to render different languages more naturally. An effort to incorporate native support for Mandarin Chinese is currently under way (W3C, 2005).

## FUTURE TRENDS

The VoiceXML standard has quickly matured and been widely embraced by the technology community, which has moved to deploy it on a large number of platforms. Additionally, new voice standards are being developed to bring together the visual and voice Web interfaces into a single "multi-modal" view of Web content.

Speech application language tags (SALT) is a standard for combining visual markup languages (HTML) with voice functionality (Salt Forum, 2003). Another multimodal specification (XHTML+Voice, or X+V) is being refined under the auspices of the W3C. These new standards will make it possible for a single interface, like a desktop Web browser or a personal digital assistant (PDA), to accept multiple types of input like keyboard/mouse input, voice input or stylus input (VoiceXML Forum, 2004).

These new specifications, along with the family of languages making up the SIF, will further perpetuate the trend toward device independence. In the future, governments will be able to deploy their information and applications for use in a variety of user agents and devices. This trend will result in improved access to government services and will provide a larger range of options for public-sector entities to provide services to citizens.

## CONCLUSION

VoiceXML and the technologies in the SIF hold enormous potential for improving the accessibility of government information and services. By utilizing these technologies governments can dramatically improve accessibility to a range of services not currently accessible by different groups of citizens. Governments should incorporate VoiceXML into their overall e-government structures and recognize that, while not a panacea of the problems of access, it fulfills an important role in the mission of e-government.

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## KEY TERMS

**Application Server:** A hardware and/or software component that operates separately but complementarily to a Web server by processing the business logic of an application. This business logic is typically expressed using a programming language executed by an application server using input received with requests to a Web server. The application server typically sits in the middle "tier" of a multi-layered Web application. The execution of the business logic may involve querying a database and formatting data for response by the Web server. While the Web server, application server and database server components may reside on the same physical server, production performance requirements typically result in these components being placed on separate physical servers.

**Call Control Extensible Markup Language (CCXML):** An XML vocabulary that allows developers to control the nature, characteristics and duration of a phone call. Where VoiceXML allows developers to create dialogs where a caller can interact with an application or program, CCXML provides higher-level control of the interaction by allowing for the creation and termination of calls, call conferencing, sophisticated call transferring and more.

**Extensible Markup Language (XML):** A markup language specification developed under the auspices of the W3C that provides a basic framework for describing data. Unlike HTML, which is engineered for the presentation of data within a Web browser or similar device, XML can be used to provide descriptive information about data for consuming applications of many types. Additionally, while HTML tags are fixed, XML tags can be custom created by developers for different purposes provided that they adhere to the underlying specification. Most importantly, the XML specification can be used to extend (hence the name "Extensible" Markup Language) the core concept of tagging data to develop new markup vocabularies for different purposes.

**Hypertext Transfer Protocol (HTTP):** A communications protocol widely used as part of the World Wide Web. HTTP is the basic method used by Web servers to send and receive data.

**Markup Language:** In the context of the Internet, a vocabulary of tags used to describe elements of data, with each element beginning enclosed in beginning and ending tags Beginning tags are enclosed in "<" and ">" symbols, and ending tags are enclosed in "</" and ">" symbols. All modern markup languages in use today, including HTML, the underlying language of Web pages, are derived from SGML, which was used extensively in the publishing world to markup text documents prior to the widespread use of the Internet.

**Open Standard, Web Standard:** Specifications promulgated by interest groups comprised of technical experts like the World Wide Web Consortium (W3C), the Organization for the Advancement of Structured Information Standards (OASIS) and the Institute of Electrical and Electronics Engineers (IEEE).

**Speech Recognition Grammar Specification (SRGS):** An XML vocabulary for creating grammars. Grammars are a central component to voice applications that define the set of words or word combinations recognized by speech recognition technologies, and allow a user to interact with a voice application. Grammars can be thought of as the vocal counterpart to the menu items in a traditional HTML Web form. When a voice application recognizes a word or

phrase defined within a grammar file, it triggers a programmatic response based on the logic of the application.

**Speech Synthesis Markup Language (SSML):** An XML vocabulary for describing how speech should be rendered by text-to-speech engines. SSML allows voice developers to specify the characteristics of computer-generated speech, providing control over pitch, prosody, rate and other speech characteristics.

**Uniform Resource Identifiers (URI):** Names or short text strings that identify resources accessible on the Internet. www.w3.org is a URI that identifies the main Web site of the World Wide Web Consortium.

**Voice Extensible Markup Language (VoiceXML):** An XML vocabulary for creating dialogs used in voice applications. Like HTML, which is used to describe how data is displayed in a Web browser or similar device, VoiceXML describes how data should be rendered audibly to a caller using a voice browser. VoiceXML provides a mature flexible foundation on which to develop sophisticated voice applications.

**Web Server:** A hardware and/or software component that "serves" Web pages over the Internet using the HTTP protocol. Web servers respond to requests from other servers or applications (like a Web browser) and send the requested resources back using HTTP.

# Voter Information Web Sites



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## INTRODUCTION

Several election studies observe that considerations regarding issues and policies have been gaining weight in voting decisions in Western countries, at the expense of previously existing class or partisan alignments (Denver, 2003). This development may imply that voters show more information-seeking behaviour. In the 1990s, various Web sites have emerged that are designed to support the voters in this job. These voter information Web sites are nonpartisan Web sites that provide the users with information on the election promises, issue positions or past performance of political parties or individual candidates. The term *Web site* should be understood as including various Internet-based resources and facilities, such as databases, decision-support systems, and discussion forums. In this article, we address the question what these voter information Web sites may offer in terms of their potential of enhancing the quality of voting decisions. The core of this exposition will centre on the Web site design features and on how the voters make use of the Web sites.

In the next section, we will highlight the distinction between prospective and retrospective Web sites. The section titled "Voter Information Web Sites" provides an overview of the main design features of voter information Web sites. Some examples of prospective and retrospective Web sites will be discussed. In the Future Trends section, we point toward some future trends. Finally, a tentative assessment will be given of the significance of voter information Web sites for enhancing the functioning of representative democracy.

## BACKGROUND

Voters can make up their minds within different time perspectives. They can orient themselves toward a comparative assessment ex ante of the candidates' or parties' election pledges (prospective voting) or toward an ex post evaluation of the incumbents' past performance (retrospective voting).

Along these lines, two types of voter information Web sites can be distinguished:

1. Web sites that assist the voters in their prospective appraisals. One type of prospective voter information Web sites assists the voters in the job of comparing election manifestos. Election pledges and issue positions are made searchable by policy area or theme. In this article, we look at "vote matches" or "voting indication tools". These are software programmes that compare the user's answers on an issue position questionnaire with a database of candidates' or parties' electoral policy propositions, and give the users an advice about the best fitting political preference.
2. Web sites that assist the voters in their retrospective appraisals. These Web sites provide information on the past performance of elected representatives. For instance, performance data can be provided by overviews of voting records; performance evaluations can be presented in the form of ratings or in qualitative terms.

Voter information Web sites can be regarded as new nonpartisan information intermediaries in the voters' information environment (Edwards, 2005; IPDI, 2004). In this environment, a variety of information providers are active: political parties and individual politicians, actors within the media system and civil society actors (interest groups and other nonpartisan and not-for-profit organisations). The Web sites to be discussed in this article were set up by civil society actors. However, traditional media organisations are also active in this domain, as well as for-profit organisations, such as media and consultancy companies.[1]

## VOTER INFORMATION WEB SITES: DESIGN CHOICES, EXPERIENCES

### Prospective Voter Information Web Sites (Voting Indicators)

Examples of voting indicators are the *StemWijzer* in The Netherlands, the *Wahl-O-Mat* in Germany, the *PolitArena* in Switzerland and several "voting machines" in Finland.

In several countries, voting indicators were available during the European Parliament election in 2004. In this section, the main design choices will be indicated. The most successful voting indicator in The Netherlands ('most successful' in terms of number of visitors) will be discussed as an example.

## Main Design Choices

In designing voting indicators, several decisions have to be made. The main design features include:

- The basis of the parties' or candidates' profiles: Voting indicators can be based on the parties' election manifestos, on issue positions formulated by the party leaders or candidates, or on the personal answers given by individual candidates on the designers' questionnaire.
- The composition of the list of propositions: Groot (2003) formulated the following criteria for the selection of propositions: content validity (the inclusion of the most important points of contention between the parties or candidates), representational validity (the duly representation of the positions held by the different parties or candidates), avoidance of overlap and discriminatory power.
- The validation and "calibration" of the voting indicator: First, by submitting the list of propositions to party officials for authorization, and, second, by subjecting the final draft of the voting indicator to a test by politicians.
- The options for the users: the response categories and the possibilities of giving additional weights to certain themes or issues.
- The presentation of the results to the user: a single voting advice, an overview of the differences between the user's profile with the parties profiles on all propositions, the inclusion of links with relevant statements in the election manifestos, and so forth.

## The Dutch Voting Indicator StemWijzer

In a multi-party system, as in The Netherlands, comparing political parties on the basis of their election pledges is a complex task for the voters. Since the Dutch parliamentary election in 1994, the Institute for Public and Politics (IPP, an independent institute for civic education) distributes a digital voting indicator, called the *StemWijzer,* in their regular package of civic educative material.[2] This first digital voting indicator was available as a diskette. A few thousand were sold to schools and individual users. In the1998 parliamentary election, the *StemWijzer* was also made available on the Internet. About 6,500 voters made use of this Internet version (Tops, Voerman, & Boogers, 2000). In the 2002 parliamentary election, the *StemWijzer* was only available on the Internet. More than 2 million voting advices were provided.

From the beginning, the designers of the system had two aims, the first of which was educative: increasing the users' knowledge about the programmatic differences and similarities between the political parties. The second aim was to assist the users with their party choice. The educative aim is important for understanding the system's design and for the assessment of its quality.

## The Design of the List of Propositions and Party Profiles

Methodologically, the *StemWijzer* works by comparing party profiles with the profile of the user. The party profiles are based on the election platforms of the political parties. A first selection is made of about 100 propositions, considering their distribution over the themes covered in the party platforms, their saliency in the public discussion and a balance between "positive" and "negative" propositions. Then, a further selection is made of about 50 propositions, in view of saliency, clarity and formulation. This list is submitted to authoritative representatives of the political parties. They determine the party's standpoints on the propositions (agree, disagree, or neutral). They can take this opportunity to give their comments on the list. Then a final selection is made. Propositions on which there is at least not one party in agreement, and one party in disagreement, are deleted. A final control is made with regard to the distribution of the propositions over the themes, and the overall differences between the parties.[3] The final list should include between 25 and 30 propositions.

## The Method for Determining the Voting Advice

The users build their own profile by working through the list of propositions. They can choose between "agree", "neutral", "disagree", or "no opinion". When they have completed the list, they can assign some extra weight to propositions. Then the computer compares the different party profiles with the user's profile on the basis of the principle of the "smallest difference". The user gets a voting advice with a list of all parties in decreasing order of congruence, together with a comparative overview of his or her points of view on each proposition and those of all the parties included in the voting indicator.

## The Use of the Voting Indicator

How are voting indicators being used? How serious are they taken by the users, and what is their actual effect on voting decisions? In a survey among visitors of political Web sites, 60% of the visitors of the *StemWijzer* mentioned their interest in information about the positions of the political parties as a main reason for visiting the Web site (Boogers & Voerman, 2003). A survey among users of the *StemWijzer* in the 2002 parliamentary election revealed that 17% of the respondents did not attach any value to the advice, and that for 27% of the respondents the advice merely confirmed their party preference. A quarter of the users indicated that the voting advice "affected" their voting decision; another quarter indicated that the advice prompted them to reconsider their initial party preference, whereas 4% indicated that the advice actually changed their party preference (Groot, 2003).

These figures seem to indicate that the users do attach a certain value to voting indicators. However, more research is needed to ascertain which functions the voting indicators fulfil for the voters, which "styles" of using voting indicators can be distinguished, and which benefits are perceived by their users. Voting indicators may stimulate political discussions in the lifeworld of their users, discussions with family members, friends and colleagues. Users may primarily appreciate the "fun" of using a voting indicator above its information and expert functions. The experiences with the Dutch *StemWijzer* indicate that an important success factor was the cooperation with trusted media organisations, such as newspapers and broadcasting organisations.

## Assessing the Quality of Voting Indicators

The main criterion for the quality of a voting indicator would seem to be its power to generate "correct" voting advices. Ideally, this would mean that a just interpretation is made of the users' political preferences (Groot, 2003). Until now, most voting indicators are restricted to matters of policy content. However, voters can have a number of different reasons to vote for a party, such as the party's "ideology", the attractiveness of its candidates, and various strategic reasons. On the one hand, the restriction to matters of content can be seen as the main strength of voting indicators, as they hold a mirror up to the user's face. On the other hand, they may confront the users with odd advices that they would not consider in any case. The quality of voting matches has to be assessed in relation to the designers' objectives and the users' information needs, but also against the backdrop of normative ideas with regard of the act of voting. A system solely designed for yielding "correct" voting advices is not necessarily facilitating an autonomous and informed voting decision.

# Retrospective Voter Information Web Sites

Basically, these systems can take two forms. First, they can assist the voters in monitoring the parties' or candidates' enactment of their election pledges. Second, they can help the voters in evaluating the representatives' performance on the basis of voters' current preferences. In terms of models of representation, the first type of information systems supports the monitoring of 'promissory representation', which is based on the idea that candidates make promises and that, when elected in office, they have an obligation to keep these promises. The second type supports "anticipatory representation", a model of representation that is solely based upon the idea that representatives try to please the voters in the next election (Mansbridge, 2003). We will discuss an example from The Netherlands and the United States.

## Monitoring Promissory Representation

Six weeks before the Dutch parliamentary election in 2002, the Web site GeenWoorden.nl ("No Words") was launched: an initiative of the Institute for Public and Politics (IPP; the same initiator of the *StemWijzer*) and the Catholic Broadcasting Association (KRO). The project had two aims. The first aim was to provide the voters with information about the past performance of the political parties in parliament; the second aim was to promote a practice of holding politicians accountable for their deeds in office. A Web site was developed with four parts: (1) Summaries of the 1998 election programmes of the (eight) political parties represented in parliament on twelve themes; (2) An overview of their deeds on these themes; (3) Expert evaluations of the reported deeds; and (4) A discussion forum for the site visitors.

Within six policy areas (multicultural society, education, transportation, public health, moral issues, and democracy), two specific themes were chosen. Most themes were selected because of their saliency in the public discussion. The project staff made summaries of the 1998 election programmes. The parliamentary parties were asked to indicate what they had done to fulfil their promises (in 200 words on each theme). An important feature of this project was therefore that the selection of the performance data was left to the politicians themselves. Experts (staff from interest groups, academic experts and 'experience experts' from the field) were

asked to evaluate the truthfulness and effectiveness of the reported deeds (100 words on each theme). The summaries, reported deeds and evaluations were placed side by side on the Web pages, searchable by political party and theme. On the discussion forum site visitors could provide their own comments on the information and offer additional reactions. Finally, the KRO broadcasted a number of programmes on radio and TV that took up the idea of the project. For instance, on a few TV programmes politicians were invited to undergo a kind of "job evaluation interview".

### Monitoring Anticipatory Representation

In the U.S. there is a long tradition of keeping track of the voting behaviour of members of Congress. Constituents, political candidates, special interest groups and researchers have long been interested in congressional voting patterns (Manning, 1996). Project Vote Smart (PVS) is a civic organisation, founded in 1992 by a number of national leaders from various backgrounds and party affiliations. It presents itself as 'a national library of factual information about candidates and elected officials' and as a "Voter Self-Defence System" against the misinformation and the manipulative tactics propagated through the mass media by candidates and professional campaign practitioners. PVS is funded exclusively through private donations and grants from private philanthropic foundations. There is a modest number of staff, as volunteers do most of the work.

Vote Smart provides the following information about candidates for state and federal office: (1) contact and biographical information, (2) campaign finance information, (3) information on issue positions, (4) voting records (on key votes) of those candidates who have held legislative office, (5) performance evaluations (interest group ratings) and (6) public statements. For each candidate, the key votes are grouped by issue. Several criteria are used to select the votes. First, the vote should be helpful in portraying how a Member of Congress stands on a particular issue. Other criteria are comprehensibility, national media attention and a very close margin in votes. Occasionally, when a specific bill is consistently inquired about on the PVS hotline, a vote is added on the Web site. Descriptions of the votes are written by PVS staff and based on information in the *Congressional Record,* with additional background information from newspapers, magazines, and so forth. Key votes selected by PVS staff go through an approval process before Web site posting, with five political scientists of opposing viewpoints reviewing both the selection and the content. The hundreds of key votes cover a wide range of issues, divided in 30 to 40 categories. Project Vote Smart also collects performance evaluations from special interest groups who provide them. The evaluations are provided on a wide range of issues (the same categories as the key votes), and include the ratings of more than a hundred special interest groups. Most performance evaluations are displayed in a percentage format. On the Web site it is pointed out that ratings done by interest groups are biased and that some groups even select votes that tend to favour members of one political party over another. The users are advised to compare the ratings by groups on all sides of an issue.

## FUTURE TRENDS

Apart from some consolidated formats, such as VoteSmart, the development of voter information Web sites is still in the phase of trial and error. In several countries, competing versions of voting indicators are provided. One scenario is their further development in the direction of more or less reliable expert systems for the voters. Another scenario is their use in TV formats of "infotainment" drawing primarily upon their "fun" potential. Increased visibility in mainstream media can help Web sites as well. Moreover, in the future, when full-fledged digital TV becomes widespread, TV can offer interactive processing of voters' preferences. Aside from the USA, retrospective voter information Web sites are a more recent phenomenon, and less widespread. The design of retrospective Web sites poses complex informational problems. A developed official system for recording votes in legislative bodies has to be available, not to mention the problems of gathering data on other deeds of elected representatives. Another problem is how to organize the evaluation of the data. In these respects, the Dutch and American cases discussed above represent contrasting cases. Design solutions have to be found within the framework of the political system, in which the Web site has to function. Another challenge is to find a format for retrospective Web sites that makes them digestible and attractive for the users. The voting indicators seem to have a clear lead in this.

## CONCLUSION

One of the central notions underlying democratic institutions is the responsiveness of political decision making toward the citizens' wishes (Saward, 1998). In a representative democracy, periodical elections provide a dual mechanism for accomplishing this. Prospectively, they give the voters the opportunity to select political parties and candidates on the basis of their election pledges.

Retrospectively, elections are a mechanism by which incumbents can be rendered accountable. By increasing the users' political knowledge and improving the quality of their voting decisions, voter information Web sites have a potential for strengthening the quality of the electoral mechanism for responsiveness. These Web sites might be a counterbalancing force in the context of the continuing personalisation of politics and an increasing reliance on promotional campaigning styles.

However, this assessment does not imply a simple endorsement of a purely information-based model of citizenship, in which we expect the citizen "to consult each candidate's Web site during an election or the best of the Web sites that track candidate biographies, elected voting records, and even keep tabs on campaign promises delinquent" (Schudson, 2004, p. 56). Such a picture is hardly realistic. Various studies highlighted the informational shortcuts and simplifying rules that voters employ (Ferejohn & Kuklinski, 1990). Information-seeking behaviour is dependent on motivation, resources and skills. However, the opportunities and agencies in the voters' information environment can make a difference (Norris, 2001). In this environment, Web sites offer possibilities for providing information from various sources, structuring it in efficient formats, and tailoring it to individual needs. The integration of voter information Web sites in the wider voter information environment, which requires the necessary linkages with other media, should be in the focus of the designers' attention.

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## KEY TERMS

**Anticipatory Representation:** A model of representation based upon the idea that representatives try to please the voters in the next election (Mansbridge, 2003).

**Promissory Representation:** A model of representation based on the idea that political parties and candidates make promises and that, when elected in office, they have an obligation to keep these promises (Mansbridge, 2003).

**Prospective Voter Information Web Sites:** Web sites that provide the user with information about the current election pledges of political parties or individual candidates.

**Prospective Voting:** An orientation in making voting decisions based on a comparative assessment of the candidates' or parties' current election pledges.

**Retrospective Voter Information Web Sites:** Web sites that provide the user with information on the past performance of individual representatives or parliamentary parties.

**Retrospective Voting:** An orientation in making voting decisions based on an evaluation of the past performance of individual representatives or parliamentary parties.

**Vote Matches:** See voting indicators.

**Voter Information Web Sites:** Nonpartisan Web sites that provide the voters with information on the election promises, issue positions or past performance of political parties or individual candidates.

**Voting Indicators:** Software programmes that compare the users' answers on an issue position questionnaire with a database of candidates' or parties' electoral policy propositions, and give the users an advice about the best fitting political preference.

## ENDNOTES

1 An example is the voting indicator provided by the media company Alma Media in Finland.

2 The word stemwijzer has a double meaning in Dutch: it can mean "voting indicator" and (the encouraging statement) "vote wiser".

3 In order to establish that the list yields enough distance between the parties the "City-block procedure" is used.

# Web Mining for Public E–Services Personalization

W

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## INTRODUCTION

Over the last decade, we have witnessed an explosive growth in the information available on the Web. Today, Web browsers provide easy access to myriad sources of text and multimedia data. Search engines index more than a billion pages and finding the desired information is not an easy task. This profusion of resources has prompted the need for developing automatic mining techniques on Web, thereby giving rise to the term "*Web mining*" (Pal, Talwar, & Mitra, 2002).

Web mining is the application of data mining techniques on the Web for discovering useful patterns and can be divided into three basic categories: *Web content mining*, *Web structure mining,* and *Web usage mining*. Web content mining includes techniques for assisting users in locating Web documents (i.e., pages) that meet certain criteria, while Web structure mining relates to discovering information based on the Web site structure data (the data depicting the Web site map). Web usage mining focuses on analyzing Web access logs and other sources of information regarding user interactions within the Web site in order to capture, understand and model their behavioral patterns and profiles and thereby improve their experience with the Web site.

As citizens requirements and needs change continuously, traditional information searching, and fulfillment of various tasks result to the loss of valuable time spent in identifying the responsible actor (public authority) and waiting in queues. At the same time, the percentage of users who acquaint with the Internet has been remarkably increased (Internet World Stats, 2005). These two facts motivate many governmental organizations to proceed with the provision of e-services via their Web sites. The ease and speed with which business transactions can be carried out over the Web has been a key driving force in the rapid growth and popularity of e-government, e-commerce, and e-business applications.

In this framework, the Web is emerging as the appropriate environment for business transactions and user-organization interactions. However, since it is a large collection of semi-structured and structured information sources, Web users often suffer from information overload. *Personalization* is considered as a popular solution in order to alleviate this problem and to customize the Web environment to users (Eirinaki & Vazirgiannis, 2003). Web personalization can be described, as any action that makes the Web experience of a user personalized to his or her needs and wishes. Principal elements of Web personalization include modeling of Web objects (pages) and subjects (users), categorization of objects and subjects, matching between and across objects and/or subjects, and determination of the set of actions to be recommended for personalization.

In the remainder of this article, we present the way an e-government application can deploy Web mining techniques in order to support intelligent and personalized interactions with citizens. Specifically, we describe the tasks that typically comprise this process, illustrate the future trends, and discuss the open issues in the field.

## BACKGROUND

The close relation between Web mining and Web personalization has become the stimulus for significant research work in the area (Borges & Levene, 1999; Cooley, 2000; Kosala & Blockeel, 2000; Madria, Bhowmick, Ng, & Lim, 1999). Web mining is a complete process and involves specific primary data mining tasks, namely data collection, data reprocessing, pattern discovery, and knowledge post-processing. Therefore, Web mining can be viewed as consisting of the following four tasks (Etzioni, 1996):

- **Information Retrieval—IR (Resource Discovery):** It deals with automatic retrieval of all relevant documents, while at the same time ensuring that the non relevant ones are fetched as few as possible. The IR process mainly deals with document representation, indexing, and searching. The process of retrieving the data that is either online or offline from the text sources available on the Web such as electronic newsletters, newsgroups, text contents of HTML documents obtained by removing HTML tags, and also the manual selection of Web resources. Here are also included text resources that originally were not accessible from the Web but are accessible now, such as online texts made for search purposes only, text databases, and so forth.
- **Information Extraction—IE (Selection and Pre-Processing):** Once the documents have been retrieved in the IR process, the challenge is to automatically extract knowledge and other required information without human interaction. IE is the task of identifying specific fragments of a single document that constitute its core semantic content and transforming them into useful information. These transformations could be either a kind of pre-processing such as removing stop words, stemming, etc. or a pre-processing aimed at obtaining the desired representation such as finding phrases in the training corpus, transforming the presentation to relational or first-order logic form, and so forth.
- **Generalization (Pattern Recognition and Machine Learning):** Discover general patterns at individual Web sites or across multiple sites. Machine learning or data mining techniques are used for the generalization. Most of the machine learning systems, deployed on the Web, learn more about the user's interest than the Web itself.
- **Analysis (Validation and Interpretation):** A data driven problem, which presumes that there is sufficient data available, so that potentially useful information can be extracted and analyzed. Humans also play an important role in the information or knowledge discovery process on the Web, since the Web is an interactive medium. This is especially important for validation and/or interpretation but under Etzioni's view (1996) of Web mining, "manual" (interactive, query triggered) knowledge discovery is excluded and thus the focus is placed on automatic data-triggered knowledge discovery.

Web mining refers to the overall process of discovering potentially useful and previously unknown information, knowledge, and patterns from Web data. In this sense, it implicitly covers the standard process of knowledge discovery in databases (KDD) and can be considered as a KDD extension applied to the Web (Markellos, Markellou, Rigou, & Sirmakessis, 2004a). Specifically, Web mining can be categorized into three areas of interest based on which part of the Web is mined:

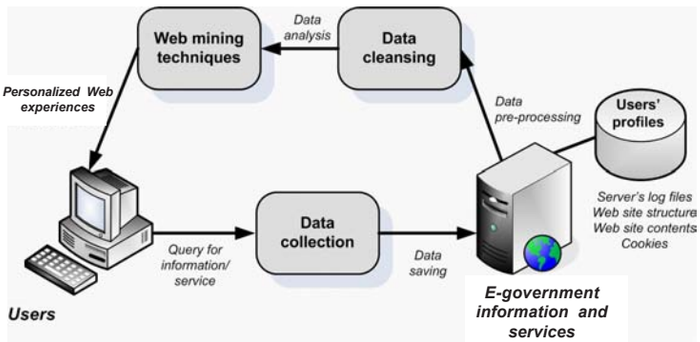
- **Web Content Mining:** Focuses on the discovery/retrieval of useful information from Web contents/data/documents. Web content data consist of unstructured data (free texts), semi-structured data (HTML documents) and more structured data (data in tables, DB generated HTML pages)
- **Web Structure Mining:** Focuses on the structure of the hyperlinks within the Web as a whole (inter-document) with the purpose of discovering its underlying link structure. Web structure data consist of the Web site structure itself
- **Web Usage Mining:** Mines the secondary data derived from Web surfers' sessions or behaviors and focuses on techniques that could predict user behavior while the user interacts with the Web (Cooley, 2000). Web usage data can be server access logs, proxy server logs, browser logs, user profiles, registration data, user sessions or transactions, cookies, user queries, bookmark data, mouse clicks and scrolls, and any other data as the result of interactions

Recently, Web usage mining (Srivastava, Cooley, Deshpande, & Tan, 2000) has been proposed as an underlying approach for Web personalization (Mobasher, Cooley, & Srivastava, 2000). The goal of Web usage mining is to capture and model the behavioral patterns and profiles of users interacting with a Web site. The discovered patterns are usually represented as collections of pages or items that are frequently accessed by groups of users with common needs or interests. Such patterns can be used to better understand behavioral characteristics of visitors or user segments, improve the organization and structure of the site, and create a personalized experience for visitors by providing dynamic recommendations. In particular, techniques such as clustering, association rule mining, and navigational pattern mining that rely on online pattern discovery from user transactions can be used to improve the scalability of collaborative filtering when dealing with clickstream and e-government data.

## WEB MINING TECHNIQUES IN E-PUBLIC SERVICES

For the implementation and successful operation of e-government, the proper design, which will be the basis in

*Figure 1. Application of Web mining techniques in e-government domain*




order to receive a series of strategic, administrative, and operational benefits, is necessary. The application of e-government in the public domain can be gradually performed in fourteen (14) levels (Markellou, Panayiotaki, & Tsakalidis, 2003). This allows the unobstructed flow of information from/to the public sector and gives the possibility not only to the citizens but also to the enterprises (private sector) to acquire better access in the services that state provides. One of these levels is the upgrade of portal with applications adjusted to every user, where Web mining techniques may be applied to improve access to information through the provided e-services (Markellou et al., 2004a; Markellou, Rigou, & Sirmakessis, 2004b).

Specifically, the deployment of Web mining in the e-government domain relates to the analysis of citizen behavior and the production of adequate adaptations. For example, given a specific citizen, the presentation of required information from an e-government portal can be tailored to meet individual needs and preferences by providing personal recommendations on topics relative to those already visited. This process is typically based on a solid user model, which holds up-to-date information on dynamically changing citizen behavior. This enables on-the-fly portal content assembly, addressing exactly what the citizen needs to know without wasting time on topics the user is already proficient or not interested in. The flowchart of this procedure is shortly illustrated in Figure 1. E-government application constructs users' profiles integrating various sources of data, pre-processes the data and applies Web mining techniques to provide the users with personalized Web experiences.

In order to personalize an e-government site, the system should be able to distinguish between different users or groups of users. This process is called *user profiling* and its objective is to create an information base that contains the preferences, characteristics, and activities of the users. In the Web domain, user profiling has been developed significantly, since Internet technologies provide easier means of collecting data about the users of a Web site, which in the case of e-government sites are citizens that must be satisfied by the provided services. A user profile can be either static, when the information it contains is never or rarely altered (e.g., demographic information), or dynamic when the user profile's data change frequently. Such information is obtained either explicitly (e.g., preferences, background, etc.) using online registration forms and questionnaires, or implicitly, by recording the navigational behavior and other users' actions from server logs, cookies, and so forth. User profiling is extremely useful to G2C (government-to-consumer) and G2B (government-to-business) applications. For example, a public authority, such as a Ministry of Finance and Economy, can customize its information/services concerning chemical and customs procedures to the relevant actors that import chemical goods. Using this aspect, the actors are facilitated in completing the necessary procedures without getting lost in the "maze" of information provided through a multi-field covering e-government Web site.

Another technique that can be used is the one of *clustering*. Page clustering identifies groups of pages that seem to be conceptually related according to the users' perception. User clustering results in groups of users that seem to behave similarly when navigating through a Web site. Such knowledge can be used in e-government in order to perform public services segmentation.

*Classification* technique can be applied after clustering in order to assign a new user to the defined groups. It uses features with high discriminative ability for defining the various profiles, for example, the profile of an active citizen may include the following values: Sex=male,

34<=Age<=40, Job=worker, Education= basic, MaritalStatus=marital, NumberOfChildren=4, and so forth. This knowledge can be used in applying personalization to e-government services and better supporting the needs of the users providing the right information, to the right people, at the right time.

For discovering relations between different types of available information in an e-government environment *association rules* can be applied. This technique may identify correlations between pages/users/services or other types of items, not directly connected and reveal previously unknown associations between groups of such items with specific similarities. The form of an association rule can be "65% of citizens that their MaritalStatus=marital search e-government portal for information about LifeEpisodes=having a baby" or "40% of the citizens who accessed help desk asked about online filling-in of tax returns and VAT." For example, the last rule may indicate that this information is not easily accessible or explanatory enough and requires redesign tasks from the portal technical group.

An extension of the previous technique comprises the *sequential pattern discovery* that can be used for revealing patterns of co-occurrence, which incorporates the notion of time. For example a pattern may be a Web page or a set of pages accessed immediately after another set of pages: "55% of new businesses who apply for a certain certificate will use the certificate within 15 days" or "Given the transactions of a citizens who has not apply for any information/services during the last 3 months, find all citizens with a similar behavior."

Finally, as search engines often appear as a helpful tool at e-government, *personalized Web search systems* may be used to enhance their functionality. In order to incorporate user preferences into search engines, three major approaches are proposed (Shahabi & Chen, 2003):

- **Personalized Page Importance:** Modern search engines employ the importance scores of pages for ranking the search results, as well as traditional text matching techniques.
- **Query Refinement:** A process composed of three steps: obtaining user profiles from user, query modification and refinement.
- **Personalized Metasearch Systems:** Metasearch systems could improve the retrieval rate by merging various ranked results from multiple search engines into one final ranked list.

## FUTURE TRENDS

On the road to enhance an e-government application and treat each user individually, personalization plays a central role. The benefits for both public authorities and citizens are significant when it really works. However, several issues still remain unclear. First of all, determining and delivering personalization is a data intensive task and requires numerous processing steps. This usually causes intolerably long response times, which in turn may lead to site abandonment. To avoid this constrain, parts of the process can be executed offline or special algorithms and structures can be used to guarantee fast online operation.

Another challenge is to ensure personalization accuracy. It is true that unsuccessful recommendations can slow down the process, confuse, and disorientate users. It is preferable not to deliver any recommendations than deliver a set of useless or harmful ones. Apart from that, personalization should be delivered in the appropriate way (avoiding user intrusion and loss of concentration) and not deprive users control over the whole process. Moreover, as e-government sites are dynamic environments, issues concerning the content or structure updating e.g. newly added topics, pages, services, etc. can be taken into consideration.

Last but not least, privacy violation during the user profiling process should be encountered (Volokh, 2000). Many users are reluctant to giving away personal information either implicitly as mentioned before, or explicitly, being hesitant to visit Web sites that use cookies (if they are aware of their existence) or avoiding to disclose personal data in registration forms. In both cases, the user loses anonymity and is aware that all of his actions will be recorded and used, often without his consent. Additionally, even if a user has agreed to supply personal information to a site, through cookie technology such information can be exchanged between sites, resulting to its disclosure without his permission. Although the new technologies and products for protecting user's privacy on computers and networks are becoming increasingly popular, none can guarantee absolutely secure communications. Electronic privacy issues in the foreseeable future will become highly crucial and intense (Markellos et al., 2004b).

## CONCLUSION

Governments enhance their attempt to offer efficient, advanced and modern services to their users (citizens and businesses) based on information and communication technologies and especially the Web. The remarkable acceptance of this powerful tool has changed the way of conducting various activities and offers citizens, businesses and public authorities limitless options and opportunities. However, the emerging problem to deal with is the way an e-government can provide its users with the right information and service according to their specific

needs and preferences. To this direction, Web mining and personalization are used for supporting tailored Web experiences.

These techniques appear as the most promising for the future, since they help to establish one-to-one relationships between users and governments, improve the performance of provided information and services, increase users' satisfaction and promote e-loyalty. On the other hand, governments take advantage of them, as long as they save costs (e.g., transactions, communication, task management, etc.), improve response times, automate various processes, provide alternative channels of cooperation and communication, and upgrade and modern their profile and image.

Many research and commercial approaches, initiatives and tools are available, based on Web site structure and contents, user's navigation, behavior and transaction history, server log files, and so forth. However, personalization requires rich data in order to provide successful output. This is not always feasible, since many users are often negative towards the idea of being stereotyped. Moreover, individuals' privacy has been put in jeopardy by the tasks of recording their activities and saving the appropriate data into their profiles. Summarizing, governments should work hard in the direction of providing the legal framework for ensuring the protection of users' privacy and also eliminating the possibility of misuse their personal information.

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## KEY TERMS

**Clickstream:** It is a record of a user's activity on the Internet, including every Web site and every page of every Web site that the user visits, how long the user was on a page or site, in what order the pages were visited, any newsgroups that the user participates in and even the e-mail addresses of mail that the user sends and receives. Both ISPs and individual Web sites are capable of tracking a user's clickstream.

**Cookie:** The data sent by a Web server to a Web client, stored locally by the client and sent back to the server on subsequent requests. In other words, a cookie is simply an HTTP header that consists of a text-only string, which is inserted into the memory of a browser. It is used to uniquely identify a user during Web interactions within a site and contains data parameters that allow the remote HTML server to keep a record of the user identity, and what actions she/he takes at the remote Web site.

**Data Mining:** The application of specific algorithms for extracting patterns (models) from data.

**Knowledge Discovery in Databases (KDD):** The nontrivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data.

**Server Log:** Web servers maintain log files listing every request made to the server. With log file analysis tools, it's possible to get a good idea of where visitors are coming from, how often they return, and how they navigate through a site. Using cookies enables Webmasters to log even more detailed information about how individual users are accessing a site.

**Web Mining:** The discovery and analysis of useful information from the Web.

**Web Personalization:** It is the process of customizing a Web site to the needs of specific users, taking advantage of the knowledge acquired from the analysis of the user's navigational behavior (usage data) in correlation with other information collected in the Web context, namely structure, content and user profile data. Due to the explosive growth of the Web, the domain of Web personalization has gained great momentum both in the research and the commercial area.

**Web Usage Mining:** The application of data mining techniques to Web clickstream data in order to extract usage patterns.

# Web Sites for Senior Citizens



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## INTRODUCTION

In the information era, the main source of productivity lies in the technology of knowledge generation, information processing, and symbolic communication (Castells, 1996; Van Dijk, 1999).

As Rifkin (2000) observed, it raises a service industry that substitutes the material economy, and the wealth relations are decided in the arena of the access and correct exploitation of these services.

For sociological scientists, the biggest challenge is to overcome the classical sociological concepts of knowledge gaps (Tichenor, Donohue, & Olien, 1970) and the digital divide, often technologically determined, aiming at investigating the social and cultural problems that obstacle elderly people, housewives, and many other social groups in using the Internet and making it useful for daily life. We need to make the cultural codes available for using new media through remediation work (Bolter & Grusin, 1999) linking digital languages to the main communication practices and media languages.

## BACKGROUND

The purpose of this article is to activate thoughts and valuations about cultural codes, fruition practices, usability problems, and affordances (Norman, 1988) that we have to consider when we project contents and services for elderly citizens.

Using ethnographic methods in order to understand daily practices without research bias (Silverstone, Hirsch, & Morley, 1992), we have investigated which content areas cause a real interest in the elderly and which ones should only be considered as false needs related to social pressure (Punie, 1997).

This work derives from a qualitative research developed in Turin, Italy, along with the Onlus Pari_go (www.pari-go.org), which was aimed at investigating the relationship between new technologies and the elderly in terms of access and content. The research was carried out thanks to the collaboration of 72 elderly people (44 women and 28 men) all over 60 years old living in a suburban area of the city.

The research integrated different qualitative methods:

- focus group in order to investigate everyday lives, needs, and expectations of the elderly about the Internet
- camera surveys and documental analysis of photos, diaries, and drafts about the relationship of the elderly with new technologies
- follow-up in-home interviews
- participatory observation during Web sessions in order to evaluate interaction experience

During the year, we also used participatory design tools (Laurel, 2003) in order to stimulate the direct contribution of the elderly in creating new solutions.

The recruitment was made using the snowball method (Silverman, 2000).

The object of the research aims at the following:

- to recognize key factors influencing how older people approach new technologies
- to define guidelines for enhancing the interaction, interface, and content design of Web sites aimed at this particular target group

The results of the study are not representative at the level of the whole category, but they offer the possibility of a critical analysis of the implementation of future Web platforms for elderly people, and of observing future developments.

## INTERACTION DESIGN

### Fear to be Wrong

One of the first problematic aspects that came out during the sessions was older people's fear of experiencing the new.

Contrary to new generations, which have grown up with video games, the elderly have abandoned the trial-and-error approach, the exploration of the world through unplanned manipulations of objects (Turkle, 1996). In so doing, gradually they have inhibited their skills for tack-

*Figure 1. How to come back from one window to the last one*


ling the new and dealing with it; meanwhile, children and young people use play to explore the world around them, to construct and dismantle, and to experience and to develop new skills without fears or regrets.

As we grow older, the fear of making mistakes, damaging something, or simply handling new technological devices become a frequent condition.

Often, older people fit into a rigid behaviour pattern: They are convinced that the only approach to using new technologies is through the instruction manual. That means learning the rules systematically in a standardised and impersonal way.

The proposed solution to this problem is experiencing interaction by playing with new technologies.

This approach can be introduced on two levels:

- at a teaching level, promoting personal styles, methods, and rhythms of learning
- in the production phase, designing accessible interfaces to encourage interaction and to reduce frustration, creating friendly error messages, and enabling people to reach the same goals even by different sequences

## Remediation of Other Media

During the research, we found a second problem; domesticated (Silverstone et al., 1992) to the idea of the TV screen and printed page, elderly people find it difficult to deal with the window concept: several pieces of information on the screen at once, which can be opened, closed, moved, or resized.

Older people have more difficulties with the PC (personal computer) brainframe (De Kerckhove, 1991) because they are used to monotasking, fixed, push-content windows as on the TV screen. For example, surfing on the Web site of a famous football team, users have been submerged by multiple windows, which opened at each click.

The capacity of concentration and memory are two recurrent problems among the elderly; in fact, dealing with parallel contents distributed in several windows generates stress and frustration, as well as orientation problems.

When the contents appear in a new page and the last one is reduced to an icon, many elderly people feel they have lost their place and cannot get back to previous pages using the back arrow in the browser.

Another aspect, which has proved to be difficult to acquire instinctively, is dealing with the scrolling windows. In fact, when the window is wider or longer than the screen, the elderly tend not to explore them.

Furthermore is the problem of the multitasking approach, in particular, the use of the windows icons in the status bar.

When designing interfaces, some tips include the following:

- eliminating multiple windows and pop-ups
- reducing the multitasking approach and making the interaction more linear
- designing clear graphic layouts
- reducing scrolling pages or making it clear that the visual pattern is longer than the page

## Consistency

The problem of the consistency of the interfaces, as defined by usability theories (Nielsen, 2000), is very important for older users.

In particular, dragging the mouse to move on the screen, double clicking to open a program icon, typing a Web-site address in the browser bar, or filling in a form is another hot issue.

For older people, putting the mouse in the correct position in the empty space and then using the keyword to insert the data requested was a difficult task.

Some tried to type without positioning the cursor in the blank area. Others wanted to type the name of a folder instead of looking for it with the mouse.

The action of sending data is also conflictive. Often, they feel disoriented and hesitate to decide if using the "send" arrow or clicking on the relative link.

Two-click interaction implies a strong effort for people with arthritis or hand deficiencies. Furthermore, it is not intuitive to decide when it is necessary to use one click or to double click.

During the research phase, a lot of time was spent training them to use the double click.

*Figure 2. Click responses not evident*



As Explorer 5 implemented it, experience suggests going back to one click as the unique interactive paradigm to open an application or activate a link.

Some useful tips for overcoming this situation are considering the use of one device (mouse or keyboard) and one interactive system (GUI [graphical user interface] or menu) instead of a mixed-interaction system.

It is better to adopt the following:

- graphic interfaces using icons and the mouse if no forms are to be filled in
- menu interfaces, accessible from the keyboard, if the Web site contains large spaces for writing text
- in the case of interactive digital TV, simple remote-control navigation systems
- the overcoming of the one-click-two-click dichotomy

## Evident Visual Response to Commands

One of the main problems that emerged during the research sessions regards the folder interfaces: In this case, when the user clicks one item of the menu, the content appears in a specific frame of the same page. For inexperienced users, the page seemed to remain unchanged for both menus and contents.

For example, when using the folder interface of http://www.anziani.it, by clicking on the different items of the folder, the only changing area is the center area. It is a response not sufficiently visual for older users who often do not catch the effect of the click.

From the research sessions, it emerged that it is not clear why the same action sometimes produces a different result; for example, clicking on a particular link sometimes proposes the content in the same page and sometimes opens a new one. The elderly find such inconsistency stressful. Designing for an older target implies simplifying and making the responses to commands evident in order to give immediate feedback and reassure them regarding the efficacy of the interaction.

## CONTENT DESIGN

In this phase of research, we investigated what older people imagine, and what they would like and expect to do with the Internet: what kind of information, contents, and services they feel they need. The content analysis was carried out considering two aspects:

- benchmarking and mapping existing Italian Web sites targeted at the elderly
- comparing real applications with the projection of the needs of the work group regarding the Internet

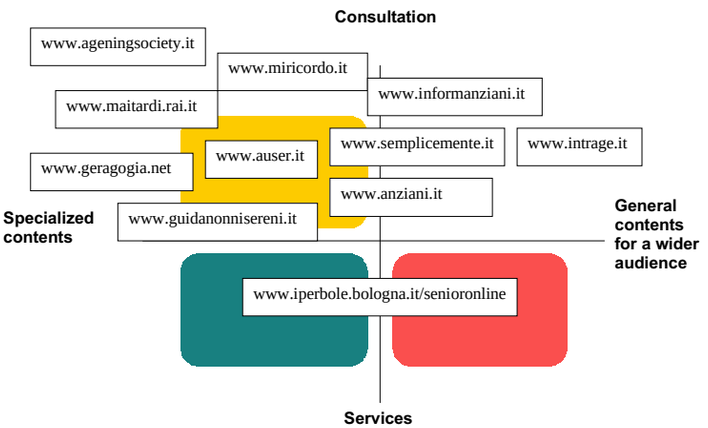
In the benchmarking phase, an evaluation grid was defined in order to identify the availability of information and services, and the availability of general or specialist content for the target.

In identifying the sample Web sites to be examined, we only considered sites targeted specifically at the elderly. The sample does not include company Web sites, which use the Internet as a promotional media offering services to older people.

As Figure 3 shows, the majority of existing sites supply information while the service sector is almost totally neglected.

Examining the area of specialist information and contents in detail, it appears that recurrent topics concern health services, assistance, and the prevention and cure of ailments of old age. After analysing the actual offer of Italian Web sites targeted at the elderly, we started investigating what contents were suitable and desirable for them.

*Figure 3. Map of Web contents for older people in Italy*




To make the task easier, we proposed this diagram (see Figure 4) with the aim of showing, describing, and discussing the different areas and functions of the Internet with the group.

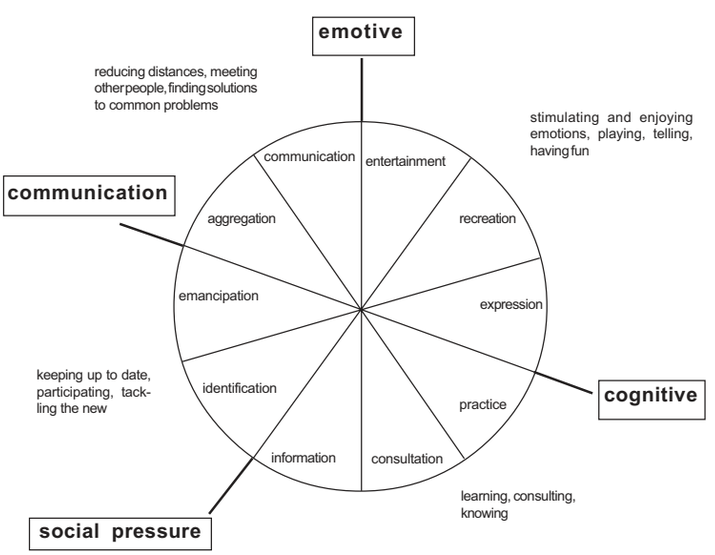
Four areas were considered:

1. **Relationship Functions:** They include activities aimed at reducing distances, meeting other people, finding solutions to common problems, and creating networks of knowledge.
2. **Emotive Functions**: That is, activities aimed at stimulating and enjoying emotions, playing, telling, and having fun
3. **Cognitive Functions:** Concern learning, consulting, and knowing
4. **Identification Functions:** Related to keeping up to date, participating, and tackling the new

The participants showed a preference for expressing their own creativity, for example, in sharing with others their experiences, poetry, pictures, tales, and so on rather than consuming prepackaged activities.

Almost everyone expressed the preference to use the Internet to enhance their access to information. They identified the time factor as the key element in accessing

*Figure 4. Textual proposal*



information, which is a discriminating factor between one citizen and another.

As well as the information services, people requested more interactive services, in particular, for dealing with bureaucracy, making health appointments, and obtaining personal advice and services. In our research, older people are less interested in the Internet from the socializing point of view. For communicating or meeting people, they think of it as the last resort, indicated only for those who have serious problems of mobility or social relations.

Physical contact and relationships are considered by elderly people to be too important to substitute with virtual experiences.

It is therefore being left aside in favour of higher priority contents.

In the same way, the sample group did not seem particularly attracted to the use of the Internet as an entertainment media.

The reason for this seems to be associated with the cost: Compared to radio, magazines, or television, the Internet connection time is thought to be expensive for what it offers.

On the information side, they would prefer more local information channels, allowing them to enjoy the rich opportunities that the territory offers and managing to bypass the traditional media, which often underline only the sensational aspects of news.

In short, they are asking for a Web site where they can easily find information and news regarding training courses, voluntary work, occasions for socializing, and so forth.

They are definitely interested in the local scene more than the broader one.

## INTERFACE DESIGN

The last step of the research was the interface design.

Using participatory design methodologies, through storyboard sketches and prototype trials, we have realized two prototypes for the graphical interface and proposed it to the participants during the focus group.

The group was invited to discuss, comment, redesign, and add images or contents to the prototypes by using mock-ups, photos, and oral and written comments, and by activating their nonspecialist competences during the exploration of the interfaces.

In the first proposal, all the menu voices are clearly expressed by textual labels: The use of images and decorations is reduced and, on the contrary, all the menu voices have a clear and unambiguous informative function.

The site is divided into four content areas according to the previous phase of the definition of contents and functions useful and desirable for the target.

The four sections are as follows:

- Information (local events, travel opportunities, local news)
- A Bit of Us (memoirs of the city, arts and crafts space)
- Easy City (health, tax, pensions, mail, public transports)
- Proposals to the local government

In this interface, the goal is to reduce the ambiguity and allow information retrieval as quick and efficiently as possible.

The contents are clearly structured by lists, and the user can search and browse them using the simple model of the data-author-title catalogue.

Also, the navigation bar is expressed by clear and extensive textual labels: Instead of the simple label "Back," we have, for instance, "Back to the previous page." Instead of the simple menu label "Insert" or "Add," we have the complete instruction "Insert a new novel."

The whole content unit is contained in the frame of the screen, without horizontal or vertical scrolling. The hypertextual complexity of the text is reduced in order to favour a linear fruition of the Web site.

*Figure 5. Visual proposal*


*Figure 6. Info visualization according to the practical experience of the town*

*Figure 7. Info visualization according to the practical experience of the town*


In the second proposal, the same typologies of contents as the first prototype are presented through metaphors (Sherson, 1999) and a visual approach (Shneiderman, 1998): The user moves the mouse on the four images in order to see the relative menus. A funny and evocative interface allows one to discover the thematic areas of the site by playing with the metaphorical meanings of the images (flowers for the artworks of the elderly, a window for travel, a bench for news and events, and the "well of desires" for proposals).

For example, in the Events section, the retrieval of the information, in spite of being presented by the data-author-title catalogue, is visualized by a map of the territory and strictly coordinated to the local knowledge of the geographical context. The information is not modelized in abstract schemes but follows an emotional design that links the abstract information to the local experience of the users.

The two proposals are supposed to give two different approaches to interaction: In the scheme, the opposite categories that the two interfaces want to suggest are summarized (see Table 1).

The last dichotomy, the present and future vs. the past, is due to the cultural brainframe of elderly people: If the first proposal represents textual and linear information retrieval, typical of the Web sites and the new-generation approach, the second proposal is based on images and on a visual approach, typical of nonalphabetical media, such as TV and popular magazines, much used by the elderly.

## FUTURE TRENDS

During the research, many interesting suggestions for future works arose.

Despite the fact that the majority of the elderly had evaluated the content proposal as being more accessible in terms of navigation and information retrieval, all the participants judged the visual interface as more attractive and desirable.

*Table 1.*

| Proposal 1: Rational | Proposal 2: Emotional |
|---|---|
| Writing | Image |
| Semantic | Analogy |
| Strictness | Metaphor |
| Awareness | Immersion |
| Functionality | Play |
| Information | Entertainment |
| Present/future | Past |

They considered the emotional proposal more original than the first one, judging the visual approach as being more innovative than the "classical" menu browsing.

After a long discussion, the elderly decided to choose Proposal 2 because of the following:

- In their opinion, the desirability value is more strategic than the usability value.
- They wanted a strong and original characterization of the Web, not to be confused with the typical generalist interfaces.
- The use of animated images is more difficult to understand than textual menus, but it allows one to overcome the fear of the interface by suggesting that the user play with it.

The use of English terms, nowadays common in media language (e.g., *news*, *mail*, *Web*, etc.), is often not understood by the elderly: Their suggestion is not to erase them, but to include the Italian translation in brackets in order to allow them to upgrade their language, favouring their inclusion in the future communication system.

This is a strong signal of their attitude to innovation: They do not want access to a simplified reality, but want to have simple and personalized tools for dealing with the complexity of the new media society.

## CONCLUSION

We have analysed up to now the main problems and proposed solutions to build accessible and appealing Web sites for elderly people.

Nevertheless, the first indication that comes out from the target group regards the approach to new technologies.

Older people confirm the absolute need of structured programs to approach new technologies in terms of the following:

- easier access to the acquisition of PCs
- Internet points close to local communities, in particular, in places where older people generally meet

- digital helpers meant as volunteers (young people or peers) to guide and assist the older people
- simple training courses just to get over the initial fear

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## KEY TERMS

**Affordance:** Norman (1988) defines affordance as a property of an object, or a feature of the immediate environment, that indicates how that object or feature can be interfaced with.

**Brainframe:** According to De Kerckhove (1988), technologies and techniques of cultural transmission shape the brain functions, modifying perceptions of the world, behaviours, beliefs, and social constructs. The author has identified three types of brainframe: alphabetic, video, and cybernetic.

**Domestication:** In Silverstone et al. (1992), it is the capacity of individuals, families, households, and other institutions to bring new technologies and services into their own culture to make them their own. Domestication concerns the learning of skills, practice, and the construction of meaning.

**GUI (Graphical User Interface):** A user interface based on graphics instead of text.

**Pull Contents:** Classical approach to Web information in which the user actively reaches the contents by seeking them through search engines or by surfing the Web.

**Push Contents:** News and information are pushed from a broadcast server to a client player. Push technologies can be used to deliver personalized and updated contents to screens without the user asking for it.

**Remediation:** As Bolter and Grusin theorized (1999), the term means the formal logic by which new media refashion prior media forms. Through immediacy and hypermediacy, remediation is one of the most important traits of new media.

# Web-Based Information System at the Brazilian Ministry of Finance

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## INTRODUCTION

The current standard of global economic growth incorporates a disposition to undertake investments in information technology that will provide public organizations with costs reduction processes and an increase in flexibility and efficiency. The Internet technology is an outstanding case that quickly occupied a significant and increasing importance relative to the changes that are occurring at the economic and social environment. The institutional presence of the government on the Internet evolved from a simple channel to furnish information to an instrument able to aggregate, to the consolidated communication ways, new forms of relationship and supply of services to the citizen (Takahashi, 2000). This coincides with a global tendency to transform simple informative Web sites in complex transactional systems, configuring a new model to collect and distribute information (Isakowitz, Bieber, & Vitali, 1998; Marche & McNiven, 2003).

It should be considered that many times the technological infrastructure and human resources capability of the government vary widely, depending on the geographical region of the country. In function of this, the internal systems, which give support to the operation of the government machine, can be benefited through the use of Web technology, if they are inserted in the resources sharing and access distribution paradigm (McLean, 1999). Web applications development of internal scope can keep little direct relation with the universal access of citizens to public services, however, can represent the universal access to scarce resources by geographical and socially dispersed government representations.

This article reports an experience of Web technology use along the deployment of an internal Web-based information system (WIS) at a Brazilian government agency. The importance of the technology is emphasized as evidenced through development rapidity, distribution economy, and operational simplicity of the developed system. Broader reflexes that reach the citizen are also discussed.

## BACKGROUND

At the beginning of 2001, the Brazilian Ministry of Finance came across the possibility that frauds could be in course, involving civil servants who worked in its payroll administration. This fact could seriously affect the government's credibility and would certainly contribute to increase the population's disbelief in the public administration.

On that opportunity, the Human Resources Coordination of the Brazilian Ministry of Finance assigned a singular task to a group of civil servants who, at that time, worked as software developers or network supporters. The job was to develop a system to register the presence of retired civil servants so that they could demonstrate they were alive. This was necessary because some people could be taking advantage of the situation by pocketing the pensions of deceased civil servants as if they were alive. The task was a particularly challenging one because of the following reasons:

a. The system would have to work in every state of the country regardless of the available infrastructure. This was a critical point, because some states were well known for their lack of up-to-date equipment, although all states were well served in terms of a countrywide network structure.
b. The system's features should have an impact on the ever-watchful press, but above all, it should be capable of keeping people who plan to fake the process from succeeding in doing so. It was suggested that a digital picture should be obtained from the beneficiary. The system also should be able to consolidate real-time information about all records across the country in a single report, to which the coordinator ought to have access.

c. There were severe budget restrictions to buy hardware and software licenses, as well as to hire advisory services.
d. The system should be developed and implemented as quickly as possible. Initially, a 4-month deadline was set.
e. The pensioners should be summoned by mail to present themselves to the nearest Ministry of Finance office.

The Ministry of Finance has offices in every state of the country. In each state there are main offices in the capitals, as well as offices in other cities. All of these are connected by means of a single Wide Area Network furnished by a government company that provides communication and networking support. In principle this fact could enable some kind of solution based on a central system accessible from almost any place in the country via Internet protocol communication.

The work group was formed and formally designated to study, evaluate, and propose a solution. The technical knowledge of the members of the group included some expertise on client-server applications using Microsoft Access, query building via SQL, LAN management, and SSL/HTTPS secure connections. There were also some experts in human resources law to provide support for the definition of the system with regard to legal aspects and restrictions.

The secretariat of Planning, Budget and Administration of the Ministry of Finance, in the person of its General Coordinator, provided the political sponsorship for every necessary action approved by the group. The only real limitation concerned the acquisition of hardware, software licenses, and advisory services. Everything should be done with the available hardware and software resources and the group should find the solution on its own.

It was possible to use four high-performance servers with network operating system licenses (Windows Server 2000) and two Microsoft SQL Server licenses. As the group was formed by members from different states in the country, some travel expenses were assured for periodic group meetings. However, most of the work should be conducted through long-distance networking.

## ASPECTS OF DEVELOPMENT

In fact, the system requirements were very simple. There were basically two critical transactions:

a. Send the beneficiary's digital picture to a file repository; and
b. Register the beneficiary's presence in a database and print a sort of "voucher" or "receipt" with his or her picture.

Brazilian law, in some cases, allowed the beneficiary's presence to be registered by a legal representative.

The available infrastructure, the resources, and mainly the know-how of the group indicated the development of a client-server application based on Visual Basic/ Microsoft Access. This option was convenient due to the sound expertise of some of the members of the group in this area and the possibility of placing the system, on the server side, in reliable machines and in a very secure and redundant environment. But this kind of solution also suffered a major drawback: the client-side system would have to be installed in every workstation in which it would be required to run. This would bring about three problems:

1. Much money would be consumed for travel.
2. It was likely that many machines would present a performance insufficient to run the system.
3. Every system upgrade would have to be distributed to all the workstations in order to update them as well. As the system was meant to be developed very quickly, many bugs were expected and frequent update operations at every workstation seemed unfeasible.

In view of the above, it was proposed that a Web-based system should be developed and located in the same secure and redundant environment. The difficulty in adopting this solution was that no member of the group had any experience in the development of this kind of system. Nonetheless, easy access from anywhere in the country to a system of this sort, the fact that no installation and no updates would be necessary at the workstations, and the modest hardware required for running a single Internet browser meant this alternative was the most viable solution. In fact, some authors have foreseen that Web-based systems will change the way in which governments, which are widespread organizations, will come to distribute and collect information (Isakowitz, Bieber, & Vitali, 1998). There was also a certain pressure from the environment concerning the efforts undertaken by the Brazilian government to increase the importance of e-government services and digital inclusion projects, almost all of which were based on Web technologies.

Some members of the group, however, resisted the adoption of the Web technology, considering it weak, unsafe, and limited in terms of resources. Yet another issue was raised in order to persuade them: the shortage of time and money to provide adequate user training. The

argument was that a Web system would be more easily assimilated by users, in the same way as any new entertainment Web site might be. Dennis (1998) also mentions this kind of expectation, that is, the belief that users learn to use Web information systems by trial and error. However, he states that this expectation has been proven generally wrong and that formal training is a critical factor for the success of a Web-based system. Therefore, this was a risky argument.

The next step consisted of choosing a low-cost but high-efficiency software platform on which the system, based on a transactional Web site, could be built. Indeed, the most substantive and effective documentation that could be found easily on the Internet concerned the PHP (Hypertext Preprocessor) language. The language seemed to be suitable to work as a dynamic HTML page generator and as a link between that kind of interface and the MSSQL Server. Additionally, the software necessary to support it was free, which fulfilled the requirement of not purchasing any software licenses. Therefore, the platform chosen was the "PHP + MSSQL Server 2000 + IIS 4.0" triad.

The workgroup was divided into five subgroups to care for the following:

a. Interface and transactions development
b. Database modeling and administration
c. Servers and network management
d. User's manual and system documentation
e. Legislation analysis

This division showed itself almost fully coherent with the argument of the "separation of levels" proposed by Merialdo, Atzeni, and Mecca (2003), according to whom Web site design should be split into three levels: the data level, the hypertext level, and the presentation (layout) level.

Although information systems development is an issue that has been studied for the last 3 decades at least, none of the methodologies proposed in academic studies was adopted by the group. Furthermore, Web systems call for certain features that are quite different from those of traditional information systems and therefore pose new managerial and technical challenges (Isakowitz, Bieber, & Vitali, 1998). As a result, the entire system was developed in the absence of systematic approaches and rigor, relying merely on the knowledge and experience of the developers. As observe by Gellersen and Gaedke (1999), this approach to Web systems development embeds risks and indeed had unfavorable reflexes at the developed system.

The first version of the system was developed in 2 months and the state of São Paulo was chosen as the testing context. Ten centers were chosen to receive the pensioners: the state capital and nine other cities. All pensioners of the state were summoned to present themselves to the chosen center nearest to them. Some pensioners had to travel up to 100 km, but 93% of them lived in one of the cities defined as a center. Older pensioners (80 or more years) were visited in their homes, where their data and picture were collected for subsequent input into the system. A group was appointed to input the registrations into the system. Part of it stayed full time at the state capital, while the rest spent 3 to 5 days in each center.

The system showed itself to be successful in terms of ease of use for the operators and convenience for the pensioners. Some compliments were made and no claims were addressed by pensioners to the agency ombudsman. Although to date no specific study has been conducted, the entire process clearly determined an increase of people's trust in this particular segment of public administration.

The decision taken after this test was to adopt the system throughout the country in the following year (2002). The system then started with 284 users, running in Brazil's 25 capital cities on a full-time basis, and at 84 centers for 3-to-10-day periods. The final total was about 60,000 records in the system.

The latest report produced by the general coordination of human resources dates from 2003. It shows the registration of 61,638 pensioners from a universe of 65,973. The 4,335 who were not registered had their situation closely verified. From these, 915 cases were, in fact, proven to be frauds and the "pensioners" had their payments suspended. The sum of about US$6,700,000.00 per year was (and since then it continues to be) saved thanks to the Web-based process (Finance Ministry, 2003). Table 1 shows the detailed results achieved for that year.

## FUTURE TRENDS

Certain issues are still to be discussed, such as fine-tuning the information system and the process as a whole. First, a survey should be conducted in order to check on the satisfaction of users and pensioners. Afterward, the codes should be reviewed and documented from a methodological point of view, so that system continuity can be assured. Then an upgrade could be considered for improving identification, eventually using biometrical technology, and in terms of operating the system through the Internet, so that electronically certified and identified pensioners could perform the registration task in their own homes.

*Table 1. Estimated savings in 2003*

| State | Summoned | Registered | | Not Registered | | Frauds | Yearly savings |
|---|---|---|---|---|---|---|---|
| | | absolute | % | absolute | % | (1) | (2) |
| Acre | 4,734 | 4,198 | 88.7% | 536 | 11.3% | 2 | 24,000.00 |
| Alagoas | 796 | 765 | 96.1% | 31 | 3.9% | 2 | 24,000.00 |
| Amapá | 5,522 | 5,059 | 91.6% | 463 | 8.4% | 2 | 24,000.00 |
| Amazonas | 356 | 352 | 98.9% | 4 | 1.1% | 2 | 24,000.00 |
| Bahia | 1,533 | 1,431 | 93.3% | 102 | 6.7% | 20 | 240,000.00 |
| Ceará | 1,430 | 1,362 | 95.2% | 68 | 4.8% | 63 | 756,000.00 |
| Distrito Federal | 3,674 | 3,485 | 94.9% | 189 | 16.5% | 178 | 2,136,000.00 |
| Espírito Santo | 983 | 968 | 98.5% | 15 | 1.5% | 2 | 24,000.00 |
| Goiás | 752 | 698 | 92.8% | 54 | 7.2% | 2 | 24,000.00 |
| Maranhão | 541 | 515 | 95.2% | 26 | 4.8% | 2 | 24,000.00 |
| Minas Gerais | 3,214 | 3,115 | 96.9% | 99 | 3.1% | 87 | 1,044,000.00 |
| Mato Grosso | 286 | 286 | 100.0% | 0 | 0.0% | 0 | 0.00 |
| Mato Grosso do Sul | 369 | 364 | 98.6% | 5 | 1.4% | 5 | 60,000.00 |
| Pará | 734 | 705 | 96.0% | 29 | 4.0% | 5 | 60,000.00 |
| Paraíba | 689 | 657 | 95.4% | 32 | 4.6% | 5 | 60,000.00 |
| Paraná | 1,959 | 1,894 | 96.7% | 65 | 3.3% | 62 | 744,000.00 |
| Pernambuco | 2,657 | 2,562 | 96.4% | 95 | 3.6% | 77 | 924,000.00 |
| Piauí | 512 | 510 | 99.6% | 2 | 0.4% | 2 | 24,000.00 |
| Rio de Janeiro | 18,193 | 17,272 | 94.9% | 921 | 5.1% | 2 | 24,000.00 |
| Rio Grande do Norte | 582 | 497 | 85.4% | 85 | 14.6% | 7 | 84,000.00 |
| Rio Grande do Sul | 2,111 | 2,023 | 95.8% | 88 | 4.2% | 21 | 252,000.00 |
| Rondônia | 4,401 | 3,985 | 90.5% | 416 | 9.5% | 3 | 36,000.00 |
| Roraima | 2,501 | 1,797 | 71.9% | 704 | 28.1% | 2 | 24,000.00 |
| Santa Catarina | 733 | 710 | 96.9% | 23 | 3.1% | 2 | 24,000.00 |
| São Paulo | 6,155 | 5,937 | 96.5% | 218 | 3.5% | 4 | 48,000.00 |
| Sergipe | 556 | 491 | 88.3% | 65 | 11.7% | 2 | 24,000.00 |
| **TOTAL** | **65,973** | **61,638** | **93.4%** | **4,335** | **7.2%** | **561** | **6,732,000.00** |

(1) Verified among non-registered pensioners
(2) Based on average benefit of US$ 1,000.00/month

## CONCLUSION

This particular case history encompasses certain issues that can eventually be identified and compared with studies that have been carried out about public administration, e-government, and Web technology use. The case shows one small example of how one government agency is expanding its use of Web technology from simple informational Web sites toward more complex systems that configure a new paradigm for collecting and distributing information, which conforms to the perspective of Marche and McNiven (2003). Also the goal to internally develop a system adapted to the restrictions of lack of resources and local infrastructure was fully attended. The case shows how simple solutions made possible the development of the system and how the Web technology contributed decisively to the success of the project.

The good performance of the information system seems to have led the pensioners to trust much more of the entire process and it produced, above all, substantial savings in government expenditures, as a result of old frauds being discovered and new ones prevented. According to Vigoda and Yuval (2003), we can say that the system constitutes an effective causal agent for a government's improvement.

The group responsible for the definition, development, and implementation of the system consisted only of civil servants. None of the members had a formal background in Web technology and no technical support was hired due to budget restrictions. This resulted, along all system development steps, in a lack of methodology, formalism, and reliance on the group's knowledge and experience. Although the system continues to work, to this day it lacks documentation and its maintenance is performed solely by one of the members of the original group.

It is interesting to observe that the system characteristic of being spread over inner-state cities shows one way in which governments can shift their focus of governance toward a relationship with citizens. This is an example that makes clear the new role of technology in public administration (Ho, 2002). The system also seems to fit an e-government approach regarding one of the issues typified in Anttiroiko (2003), that is, to be dealt with in political communities.

Finally, the extension of the model proposed in this case can be considered to the entire Brazilian social security system, actually affected by many managerial and process problems. A huge effort should be undertaken in advance to digitally include a large mass of pensioners. This certainly would contribute a very significant step toward the consolidation of Brazilian e-government practices.

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## KEY TERMS

**Beneficiary:** Pensioner, the person who receives retirement or pension wages.

**Digital Inclusion Projects:** Actions taken by governments for making information technologies available to all citizens.

**Informational Web Site:** The Web site that provides read-only information, not performing any "insert" or "update" interaction with a database.

**Internal Systems:** Systems that give support to the operation of the government machine.

**Resources Sharing:** Allocation of the same resources to multiple users.

**Traditional Information Systems:** Systems based on classic mainframe or client-server approaches, making no use of Internet browsing or Web services.

**Transactional Web Site:** The Web site that works as a true information system, that is, it provides information and performs "insert" and "update" transaction over a database.

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